

# **If I think it works, I like it**

Towards an increased understanding of  
consumer opinions about food-related nudging

by

Ingrid Laukeland Djupegot

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University of Stavanger  
NO-4036 Stavanger  
NORWAY  
[www.uis.no](http://www.uis.no)

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## Summary

Nudging has emerged as an innovative tool to influence consumer decisions within areas ranging from reduction of CO<sub>2</sub>-emissions, increasing pension savings and facilitating healthy food choice. Nudges aim to guide consumer behavior in pre-decided directions without forbidding the options or changing economic incentives and are part of the behavioral public policy-movement which has arisen throughout the past decade. The increased application of nudges as measures to influence public behavior has however not advanced without controversy, and the current thesis focuses on consumer opinions about the use of nudging in a food-related context. Consumer opinions about nudging have been a largely neglected research area, yet a number of recent studies indicate relatively high support of nudging, despite its somewhat manipulative nature. Perceived effectiveness is identified as an important driver of acceptance of nudging, yet little is known about the underpinnings of this association. In order to provide a deeper theoretical and practical understanding of consumer acceptance of nudging, it is not sufficient to solely focus on identifying factors that are directly associated with acceptance, as it is also crucial to expand the causal chain backward and explore the antecedents behind the main drivers. The overall objective of the current thesis is to increase our understanding of consumer acceptance of food-related nudging. The objective is approached by a two-fold perspective, which aims to shed light on 1) main drivers of acceptance of food-related nudging, and 2) the antecedents of one of the main drivers of acceptance of nudging, namely perceived effectiveness of nudging.

The objective is addressed by means of three research papers. The first paper is dedicated to replicating and extending the knowledge about factors that are directly associated with acceptance of food-related nudging, and the two succeeding papers aim to take a step back in the causal chain by exploring how different message designs influence

consumers' perceived effectiveness of food-related nudging. The main logic of inquiry is a quantitative and deductive research approach, and the first study is designed as a cross-sectional survey, while the two succeeding papers are designed as factorial experiments. The current thesis identifies perceived effectiveness and perceived limited freedom of choice to be significant predictors of acceptance of food-related nudging, and furthermore, a number of aspects related to the message, the sender and the receiver are found to be of significant importance when public information about nudging are communicated. The findings of the three papers in this thesis contribute to increase the knowledge of factors that are directly associated with acceptance of food-related nudging and additionally explores the antecedents of one of the most important drivers of acceptance, namely perceived effectiveness. The thesis thus contributes to increase both theoretical, practical and methodological knowledge within the domain of consumer acceptance of nudging, and the findings also hold several implications for policy-makers that are planning to implement nudging as part of public policy.

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## **1 Introduction**

Nudging is defined as “any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives” (Thaler and Sunstein, 2008, p. 6). Nudging has become a popular approach to public policy, and at last count, there were more than 60 ‘behavioral insight teams’ or ‘nudge units’ across the world (Chen et al., 2017; Holmes, 2018). Consumer decisions within areas ranging from organ donation and reduction of CO<sub>2</sub>-emissions to pension savings and food choice have been approached by different nudge-designs (Thaler and Sunstein, 2008; Zeina et al., 2019), and nudging is part of the behavioral public policy-movement that has arisen throughout the past decade (Chen et al., 2017).

The widespread application of nudge-designs aimed at a wide range of behaviors has however not advanced without controversy, and nudge units, partly or fully funded by the governments, have given heat to a debate on the ethical aspect of nudging where governments have been accused of being paternalistic nanny-states that interfere with people’s freedom of choice (Selinger and Whyte, 2011; Blumenthal-Barby and Burroughs, 2012; Schmidt, 2017; Sugden, 2017). The critics hold that nudges challenge consumer autonomy (Mols et al., 2015; Clavien, 2018; Levy, 2019), and the concept nanny-states reflects the perception of nudging as a paternalistic top-down approach to influence public behavior (Selinger and Whyte, 2011).

New strategies implemented by governments need to gain foothold in the public in order to be perceived as acceptable measures to influence behavior (Tannenbaum et al., 2017; Hall et al., 2018; Hagman et al., 2019), yet, until recently, consumer’s opinions about nudging have been largely neglected (Evers et al., 2018). However, a number of recent studies indicate relatively high public support of nudging, despite its somewhat manipulative nature (Hagman et al., 2015; Jung and Mellers,

2016; Reisch and Sunstein, 2016; Reisch et al., 2017; Bauer and Reisch, 2019; Reynolds et al., 2019), and perceived effectiveness has been established as a strong and reliable predictor of acceptance of public policy and nudging (Diepeveen et al., 2013; Petrescu et al., 2016; Marteau, 2017; Bang et al., 2018; Cadario and Chandon, 2019; Reynolds et al., 2020). Still, Hagman et al. (2019) state that several questions about what makes a nudge acceptable remains unanswered, and Reynolds et al. (2018) indicate that there has been little empirical research testing the most effective ways of communicating evidence of a policy's effectiveness.

In order to provide a deeper theoretical and practical understanding of consumer acceptance of nudging, it is not sufficient to solely focus on identifying the main drivers of acceptance, as it is also crucial to expand the causal chain backward and explore the underlying mechanisms of this concept. In other words, drawing on the established association between perceived effectiveness and acceptance of nudging, an important inquiry is to investigate how to communicate the effectiveness of public policies in a form that appeals to consumers. The current thesis aims to contribute to increase our understanding of consumer acceptance of nudging both by investigating factors that directly influence acceptance, but also by addressing the antecedents behind one of the strongest and most reliable predictors of acceptance, namely perceived effectiveness. The objective of this thesis in relation to this is further described in the following section.

## ***1.1 Objective and research approach***

This thesis focuses on consumer opinions about nudging, and more specifically, the overall objective is to increase our understanding of consumer's acceptance of food-related nudging. The objective is approached by a two-fold perspective which aims to shed light on 1) main drivers of acceptance of food-related nudging, and 2) the antecedents behind one of the main drivers of acceptance of nudging, namely perceived effectiveness of nudging. This thesis includes three research papers. Overall, the first paper is dedicated to replicate and extend the current body of knowledge on factors that are directly associated with acceptance of food-related nudging, while the two succeeding papers aim to shed light on the antecedents of perceived effectiveness of nudging by exploring how different message designs influence consumers' perceived effectiveness of food-related nudging.

In order to address the main objective, I apply a triangulation of theories, data sources and methods, and shift between an exploratory, descriptive and explanatory approach. My main logic of inquiry is a deductive research approach, where I propose hypotheses building on established theory, which I empirically test by the use of different research designs. The focus of the current thesis is on food-related nudging and drawing on the strong association between diet and health, the majority of the theoretical- and empirical literature presented in this thesis applies a health-related approach. Still, as indicated above, nudging has also been applied to a wide range of other behavioral domains, and although I only touch upon material from other contexts, this should not be perceived as an underestimation of the importance of the research within other behavioral domains, but rather reflects the specific focus of the current thesis. Finally, it is important to underline that the current thesis is not about measuring whether nudges actually work, but about exploring consumers' acceptability of nudges as measures to influence food-related behavior.

## 1.2 Clarification of key concepts

The current section introduces the key concepts of this thesis. All of these concepts will be further described and elaborated in the subsequent chapters, and the current section is thus only meant as an introductory guide. *Nudging* is already defined in the introduction-chapter on page 1, but in short, nudges are measures that aim to guide consumer decisions in pre-decided directions, without forbidding the alternatives or changing economic incentives (Thaler and Sunstein, 2008). Nudges are applied in the wider environment, meaning that they are alterations of the choice architecture that intends to remind or push consumer choice in a certain direction. Although nudging was not coined as a concept until 2008, it builds on established theoretical foundations from social- and cognitive psychology as well as behavioral economy and libertarian paternalism (Thaler and Sunstein, 2008; Marteau et al., 2011). To the best of my knowledge, there is no precise operational definition of *food-related nudging*, but in the current thesis, food-related nudging is defined as nudges that aim to influence decisions and choices within the realm of food-related behavior, of which decisions in regard to selecting, buying and consuming foods are of particular interest.

Nudging has increasingly been introduced as part of *public policy*, and public policy can be defined as the outcome of decisions or visions by governments or political actors to influence public behavior and decision making (Lawrence and Robertson, 2007). Furthermore, *behavioral public policy* describes an alternative approach to public policy which incorporates the use of behavioral insights to influence the behavior of the public, of which nudging is one of the tools that might be applied (OECD, 2017). As indicated in the introduction, the increased application of nudges in public policy is a development that has not advanced without controversy, and this has resulted in the growth of *acceptance of nudging* as a research area. Acceptance of nudging is a relatively new concept, and to the best of my knowledge, there is currently no precise operational definition. Still, previous research has

investigated the acceptability of other types of interventions and policies (Sekhon et al., 2017), and drawing on this, I define acceptance of nudging as the degree that consumers support, and thus approves the implementation of nudges as tools to influence behavior. Finally, readers may notice that the terms *support*, *acceptance* and *acceptability* are used interchangeably in the literature, and these terms are also used synonymously in the current thesis.

### ***1.3 The structure of this thesis***

The rest of this thesis is structured as follows: Chapter 2 outlines the background for the overall objective of this thesis. Here, I take a step back and focus on overarching challenges related to the use of nudging as a tool to influence public behavior. Of particular interest are the differences between traditional and behavioral public policy, the theoretical underpinnings of nudging, the critique of nudging as a behavioral tool, as well as the growth of acceptance of nudging as a research area. Chapter 3 presents an overview of the three papers that are included in this thesis, a summary of the findings in each of the papers as well as the paper's current publication status, supplemented by a figure that illustrates how the three papers are connected. Chapter 4 offers methodological reflections both for the methods applied in each of the papers separately and for the thesis overall. Chapter 5 provides a brief summary of the results across the three research papers, accompanied by a model that visualizes the findings of this thesis. Chapter 6 provides an overall discussion of my main findings and contributions and ends with suggesting some fruitful paths for future research within this research area. Finally, some concluding remarks are offered in chapter 7, before the thesis ends with the full versions of each of the three research articles.

*Introduction*

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## **2 Background**

Western countries have experienced a massive increase in non-communicable diseases over the past couple of decades (Naghavi et al., 2017). This development has brought along vast economical and health-related challenges, which has required alternative thinking in public policy and health promotion (Benartzi et al., 2017). As outlined above, behavioral public policy (BPP) describes an alternative approach to public policy which emphasize use of behavioral insights to influence the behavior of the public (OECD, 2017; Oliver, 2017), and many countries have established governmentally funded BPP-units over the past ten years (Chen et al., 2017; Zeina et al., 2019). A similar development can be found within the field of public health promotion, which has moved from a top-down approach with focus on educating and instructing the public to make healthy choices, to a more behaviorally oriented approach that focuses on empowering the public to make healthy choices, i.e. by making the healthy options the most attractive in the choice context (Marteau, 2018; Bauer and Reisch, 2019). As mentioned in the introduction, the increased application of a behavioral approach to public policy and health promotion has not advanced without controversy. A closer look at the characteristics of the traditional vs. the behavioral approach to public policy and health promotion as well as the theoretical underpinnings of nudging contributes to understanding some of the background for this criticism.

### ***2.1 Traditional vs. behavioral public policy***

Policy-makers can apply a number of different measures to influence public behavior, which each has its strengths and limitations. The Nuffield Council on Bioethics (2007) has introduced an intervention ladder which categorizes measures to influence health-related behavior

due to their level of intrusiveness, where the level of intrusiveness relies on an evaluation of the ‘proportionate’ relationship between potential benefits of the measure against the interference in people’s lives. The traditional approach to public policy has been to regulate public behavior by legislation, bans, and taxation with accompanying penalties for those who choose not to follow the rules (Marteau et al., 2011). The traditional system can be categorized as *hard policy*, but at the same time, the system is transparent and allows the public to actively choose or not choose to follow it. Awareness campaigns aimed at educating and informing the public to make the right choices have been a widely applied measure in traditional policy, yet although this type of measure is low on intrusiveness, the effects on public behavior are also often limited (Marteau et al., 2012; Allan et al., 2017; Bauer and Reisch, 2019). A more successful measure to influence behavior within the traditional public policy is the use of taxation. The use of this type of measure is however categorized as highly intrusive (Nuffield Council on Bioethics, 2007), and often receives relatively low support in the public (Hagmann et al., 2018). Despite this, research indicates that support of most policies increase after its implementation (Diepeveen et al., 2013), and furthermore, as taxation, bans, and penalties have the potential to successfully influence public behavior within several domains, a high level of intrusiveness might be a price worth paying in cases where the harm-benefit distinction can be easily judged (John et al., 2009). For example, penalties for drunk driving or speeding can for most people easily be judged as defensible, but within a domain like food-related behavior, the harm-benefit distinction might not be judged just as easily. In practical terms, this implies that although it is reasonable to assume that most people would agree on the benefits of having a healthy diet and lifestyle, one should also expect that the preferred approach to achieve this goal might be highly variable. Within this type of behavioral domain, softer and less intrusive policies may be more applicable, and this is where behavioral public policy (BPP) enters the scene.



There are several inconsistencies between people's intentions and behavior (Marteau et al., 2012). When people want to lose weight, they know that veggie snacks are a better option than potato chips, yet crisps are repeatedly chosen. A study from 2006 found that approximately 45% of the activities people do throughout a day are results of habits (Verplanken and Wood, 2006), and the literature indicates that it is easier to change the environment of the decision-making process than changing our way of thinking (van Kleef et al., 2012). BPP introduces an alternative approach to regulate public behavior and can be categorized as a soft policy that emphasizes behavioral insights to influence consumer choice (OECD, 2017; Oliver, 2017). The theoretical underpinnings of BPP are further described in the following section, but in short, the behavioral approach to public policy builds on the perception that a huge part of human decision-making result from unconscious reasoning (Marteau et al., 2012). Drawing on this knowledge, policy-makers should rather focus on influencing consumer decisions without the need to activate the "attitudinal machinery". In summary, the behavioral approach to public policy and health promotion requires less active involvement and decision making from the public as compared to the traditional policy, but at the same time, this also brings along issues regarding transparency, consumer autonomy and freedom to choose. An overview of the literature on consumer opinions about the traditional vs. behavioral approach to public policy is offered in chapter 2.4. The following section focus on the theoretical underpinnings of BPP and nudging.

## ***2.2 The theoretical underpinnings of nudging***

Richard Thaler and Cass Sunstein are credited for coining *nudge* as a concept in their book with the same title from 2008. Nudging is practical execution of BPP, and a bit simplified, nudges are measures that guides behavior in a pre-decided direction, but at the same time leaves the

receiver with the option of going in the other direction, if that is what he or she prefers (Thaler and Sunstein, 2008). Nudging is a relatively new concept, but as Halpern points out in his book *Inside the nudge unit*, “people have been nudging each other for as long as mankind has existed” (Halpern, 2015, p. 13). The fundamental ideas behind nudging build on established theoretical principles from behavioral economy, social- and cognitive psychology and libertarian paternalism (Thaler and Sunstein, 2008; Marteau et al., 2011; Marchiori et al., 2017). The psychological underpinnings of nudging are largely based on theories of dual-process reasoning (Marchiori et al., 2017), which categorize human decision making as results of system 1 and system 2 thinking (Stanovich and West, 2000; Kahneman, 2011). A bit simplified, system 1 thinking is fast and impulsive, and decision making often occurs automatically without the activation of conscious deliberation. System 2 on the other hand, is slower and more reflective, and this type of decision making is to a larger extent a result of active thinking and conscious deliberation (Kahneman, 2011). In practical terms, system 1 thinking most often occurs when we are faced with situations or tasks that we are familiar with, like summarizing 3+3 or taking on the seat belt when you enter the car, while system 2 thinking takes the lead when we are faced with more demanding situations or tasks, like multiplying 93x74 or comparing the nutritional value of different food products. Furthermore, it is a common perception that these two systems work independently of each other, while they in fact rather should be perceived as collaborators with a somewhat differing view on the optimal outcome of the choice task or situation (Bargh, 1994; Marteau et al., 2012). Furthermore, although some processes are primarily automatic, this is not synonym with the fact that they cannot be altered and controlled if we are aware of them (Bargh, 1994), and nudging embraces the automaticity in the decision-making process by emphasizing how the design of the choice context influence our decision making (Thaler et al., 2014).

Another important theoretical underpinning of nudging is the view of humans as being only bounded rational (Thaler and Sunstein, 2008; John et al., 2019). In contradiction to the view on rationality in traditional economics, where humans are perceived as rational decision-makers who are capable of finding the optimal outcome in the choice context (Gigerenzer and Selten, 2002), bounded rationality postulates that human decision making is limited by our cognitive capacity and time available in the choice context, as well as our ability to process information (Simon, 1972; Kahneman, 2003). In practical terms, this implies that when a choice is made, the outcome often ends up being the option that requires the lowest effort. Furthermore, research has shown that consumers tend to suffer from choice inertia, meaning that if you are facing a choice where one of the options is to not choose, this often ends up being the outcome (Johnson et al., 2012). Thus, it should be no surprise that changing the default option is one of the strongest and most effective nudges (Johnson et al., 2012; Bauer and Reisch, 2019).

The fact that consumers make numerous decisions throughout the day, many of these even without actively thinking about it, opens the opportunity to actively design the choice context and thereby guide (nudge) consumer choice in pre-decided directions. Nudging has become a particularly popular measure within food-related behavior (Hollands et al., 2017; Karevold et al., 2017; Bauer and Reisch, 2019), probably because nudging has the inherent characteristic of both being able to get people to do more of a behavior or to do less, or even refrain from a behavior. In practical terms, this implies that nudging can both be used to get people to eat healthier, and at the same time to avoid the less healthy options. Examples of nudges that has been applied within the context of food-related behavior over the past decade includes placement nudges (i.e. moving healthy products to the most visible locations or removing sweets from the cashier area), labeling nudges (i.e. traffic-light labeling, smileys and/or nutrition labels to indicate the nutritional quality of a product or dish in a restaurant menu), portion size nudges (i.e.

alteration of size and/or shapes of plates, glasses, cups, and cutlery) and default nudges (i.e. setting the small portion size as the default option in the restaurant, or adding a piece of fruit to the brown-bag lunch in schools and cafeterias) (Bauer and Reisch, 2019). Although nudging is presented as an innovative and effective tool to influence food-related behavior, research findings indicate that the effect of nudges seems to be highly context-dependent (Arno and Thomas, 2016; Allan et al., 2017; Sunstein, 2017; Holmes, 2018; Bauer and Reisch, 2019). For example, Allan et al. (2017) reviewed the effect of environmental interventions for altering eating behaviors in a workplace setting and found that 13 of 22 studies reported significant changes. This picture largely resembles the findings in a meta-review of 39 review articles on nudge-related topics, where the overall findings indicate that evidence on the effectiveness of different nudges is not consistent across contexts and behaviors (Bauer and Reisch, 2019). These results underline the importance of pre-testing the actual effect of nudges in specific contexts before implementing them as part of public policy. As outlined in the introduction chapter, the focus of the current thesis is however not on the actual effectiveness of different types of nudges, but on consumers' acceptance of nudges as measures to influence food-related behavior. In the two following sections, I focus on the critique of implementing nudges as part of public policy, and the growth of acceptance of nudging as a research area.

### ***2.3 Critique of nudging***

One of the most important ingredients of a nudge is that the consumer must always have the opportunity to opt-out, and the costs of doing so should not be high (Thaler and Sunstein, 2008; Sunstein, 2018). Following the previously proposed distinction between the two systems in dual-process theories, nudges can also be categorized depending on whether they are designed to address conscious or more unconscious processes in consumer decision making (Sunstein, 2016). System 1

nudges thus include measures that are designed to function without the need for conscious deliberation, while system 2 nudges to a greater extent require activation of the attitudinal machinery. Nudging falls midway on the abovementioned intervention ladder which categorizes measures to influence health-related behavior due to their level of intrusiveness (Nuffield Council on Bioethics, 2007). Yet, ironically, although nudging was originally introduced as a freedom preserving approach, it is criticized for undermining consumer autonomy and freedom of choice. As mentioned in the introduction of this thesis, there has been heated debates about the acceptability of nudges as tools to influence consumer behavior (Mols et al., 2015; Clavien, 2018; Levy, 2019), where governments that initiate application of a behavioral approach to public policy have been criticized for being paternalistic nanny-states that interfere with the public's autonomy and freedom of choice (Selinger and Whyte, 2011; Blumenthal-Barby and Burroughs, 2012; Schmidt, 2017; Sugden, 2017).

System 1 nudges are found to be particularly problematic by the critics as the possibility to opt-out from this type of nudges can be questioned (Oliver, 2017). Changing the default option from an opt-in to an opt-out alternative for organ donation is an example of a system 1 nudge that has been heavily debated (Johnson and Goldstein, 2003; MacKay and Robinson, 2016; Fan and Chan, 2017). Furthermore, reducing the size of plates and cutlery to make people eat less or moving unhealthy products to less visible locations in cafeterias, are examples of food-related nudges that might be perceived as manipulative due to transparency concerns and the limited possibility for opting out (Johnson et al., 2012; Barton and Grüne-Yanoff, 2015; Schmidt, 2017). The originators of nudge have responded to the critique against nudging in a large number of publications, and Sunstein has published a 'bill of rights' for nudging (2019) which offers five principles for creating acceptable nudges. These hold that nudges should 1) be consistent with people's values and interests, 2) be for legitimate ends, 3) not violate individual rights, 4) be

transparent and 5) not take things from people without their consent (Sunstein and Reisch, 2019). The critique of nudging has however mainly been based on the opinions of professionals and practitioners, while knowledge on the opinions of the public has been more limited (Hagmann et al., 2018; Reynolds et al., 2019). Knowledge about consumer's acceptance of nudging is thus identified as a gap in the literature that deserves further attention.

## ***2.4 Acceptance of nudging***

Public acceptance of policies comprises consumer's thoughts and feelings about the application of a new or existing policy (Sekhon et al., 2017; Reynolds et al., 2019). In the current thesis, acceptance of nudging is defined as the degree that consumers support, and thus approves the use of nudges as tools to influence food-related behavior. Several scholars have taken interest in questions related to consumer opinions about nudging over the past five years, and acceptance of nudging has been a rapidly growing research field (Hall et al., 2018). The body of literature on acceptance of nudging is addressed in detail in the three research papers, and the current section provides a shorter overview of the main trends within this research area.

Public support of policies is of crucial importance both for the success of the policy-maker and for successful adoption of the policy, and lack of public support of policies can evoke strong responses which might lead to deselection of the responsible politicians (Diepeveen et al., 2013; Tannenbaum et al., 2017; Hagmann et al., 2018; Hall et al., 2018). Public acceptance of nudging has been compared to the acceptance of traditional policies like taxing, education- and awareness campaigns. For example, Petrescu and colleagues (2016) compared the acceptance of nudging vs. taxing vs. education-campaigns as measures to reduce consumption of sugar-sweetened beverages, and their results showed

that consumers reported the highest support of education-campaigns, followed by nudges and thereafter taxing. Furthermore, Hagmann and colleagues (2018) compared public acceptance of taxes, labels, and nudges as measures to reduce sugar intake, and their results showed that support-rates varied with the intrusiveness of the intervention, with taxing and reduction of portion sizes receiving the lowest support rates, and front-of-package nutrition labeling and public health campaigns receiving the highest support rates. In addition, Hagman and colleagues (2019) investigated the effect of presenting nudges along with more paternalistic policy alternatives like legislation and less paternalistic alternatives like no behavioral intervention, and their results somewhat surprisingly showed that acceptance of nudging not necessarily increased when they were presented as alternatives to more paternalistic alternatives like legislation.

As outlined in the introduction, most studies indicate relatively high levels of acceptance of nudging, despite its somewhat manipulative nature (Hagman et al., 2015; Jung and Mellers, 2016; Reisch and Sunstein, 2016; Reisch et al., 2017; Bauer and Reisch, 2019; Reynolds et al., 2019). Acceptance of nudging has been investigated and compared across nations, between different types of nudges (e.g. acceptance of system 1 vs. system 2 nudges) and in relation to sociodemographic factors (Jung and Mellers, 2016; Reisch and Sunstein, 2016; Reisch et al., 2017; Loibl et al., 2018). The majority of these studies provides a description of a nudge, and thereafter ask “do you approve of this nudge?” with alternatives presented as dichotomous “yes”/“no” responses. Another approach within this research area is the attempt to identify factors that might explain accept-rates across different types of nudges (Petrescu et al., 2016; Evers et al., 2018). Several factors have been suggested to influence acceptance of public policies, including the behavior that the nudge targets, the target group of the nudge, the perceived intrusiveness of the nudge, the perceived effectiveness of the nudge and the context of application (Diepeveen et al., 2013; Hagman et

al., 2015; Petrescu et al., 2016; Sunstein, 2016; Tannenbaum et al., 2017; Hagmann et al., 2018; Hall et al., 2018; Loibl et al., 2018; Cadario and Chandon, 2019). Yet, it is worth mentioning that the majority of studies on acceptance of nudging apply cross-sectional designs, which limits the possibility of drawing causal inferences. The attempts to identify factors that might explain accept-rates across different types of nudges have contributed to an increased understanding of the underlying mechanisms of acceptance. For example, a study by Sunstein (2016) indicated that consumers prefer system 2 over system 1 nudges, yet later research indicates that it is rather the perceived effectiveness of nudges that explain the differing accept-rates, and not necessarily the behavioral approach (system 1 vs. 2) of the nudge per se.

#### *2.4.1 Perceived effectiveness and acceptance of nudging*

Perceived effectiveness has been identified as a significant and reliable predictor of support of public policies within various behavioral domains, and perceived effectiveness is also established as an important driver of acceptance of nudging (Diepeveen et al., 2013; Cornwell and Krantz, 2014; Petrescu et al., 2016; Marteau, 2017; Bang et al., 2018; Cadario and Chandon, 2019; Reynolds et al., 2020). Based on this, the perceived effectiveness of nudging might be viewed as a catalyst that could facilitate support (Reynolds et al., 2018). Still, Bang et al. (2018) indicate that the consequences of perceived effectiveness are poorly understood, and according to Reynolds et al. (2019), there has been little empirical research testing the most effective ways of communicating evidence of a policy's effectiveness. In more practical terms, this implies that although perceived effectiveness is established as a reliable predictor of acceptance of nudging, policy-makers have limited use of this knowledge as they lack information on which factors that influence the perceived effectiveness of nudges. In order to address this knowledge



gap, it is necessary to take a step back in the causal chain and investigate the antecedents of perceived effectiveness of nudging.

Framing of information has a major impact on how the content is perceived (Chong and Druckman, 2007; Briñol and Petty, 2012; Oliver, 2017). Imagine that you are reading the newspaper and as you slide to the next page an article about measures to facilitate healthy behavior pops up. Do you read the article? If you do, which factors influence what you think of the content? Is it the credibility of the source? The strength of the arguments? The target group of the measure? Or maybe the intrusive nature of the measure provokes you? Research within persuasion and attitudes holds that how information is perceived depends on four factors, namely the message, the sender, the receiver and the context (Briñol and Petty, 2012). Drawing on this, it is reasonable to assume that how information about nudges are communicated may influence the perceived effectiveness of the nudge. Exploring how different message designs influence the perceived effectiveness of nudges can thus contribute to clarify the association between perceived effectiveness and acceptance of nudging. It is however important to underline that the goal is not to provide policy-makers with information on how they can influence or manipulate the public's perceived effectiveness of nudges, but to understand how different message designs influence consumer opinions about nudges as measures to facilitate healthy food choice.

To summarize, the net of factors associated with consumer acceptance of nudging has evolved to be continuously wider, but not deeper, and important questions within this research area still remain unanswered. One of the main critiques of nudging is that nudges limits the public's freedom of choice, but as mentioned above, this criticism is largely based on the voices of professionals and practitioners, while knowledge on consumer opinions about nudging has been more limited. With this in mind, an interesting inquiry is to investigate consumer opinions about nudges, in order to clarify if the criticism resembles the view of the

general public, which has also been identified as a gap in the literature by other scholars (Petrescu et al., 2016). As outlined above, perceived effectiveness has been identified as a reliable predictor of acceptance of nudging, and the validity of this suggested association would be further strengthened by additional replication. The antecedents behind this main driver of acceptance should also be scrutinized in order to provide a deeper theoretical and practical understanding of consumer acceptance of nudging.

The current thesis aims to address the abovementioned research gaps, and the overall objective is to increase our understanding of consumer acceptance of food-related nudging both by focusing on factors that are directly associated with acceptance of nudging and by scrutinizing perceived effectiveness as a catalyst that may influence the acceptance of food-related nudges. The next section presents my approach to the main objective of the current thesis, provides an overview of the three research articles that I have conducted, and illustrates how these three papers are connected.

### 3 The papers in this thesis

This thesis investigates consumer opinions about food-related nudging, and the overall objective is addressed by means of three research papers. The thesis is built in a cumulative structure, meaning that the findings of the first paper gave course to the following two papers. The figure below illustrates how the papers in this thesis are connected, and the objective, hypotheses and main findings in each of my three research papers are summarized in table 1.

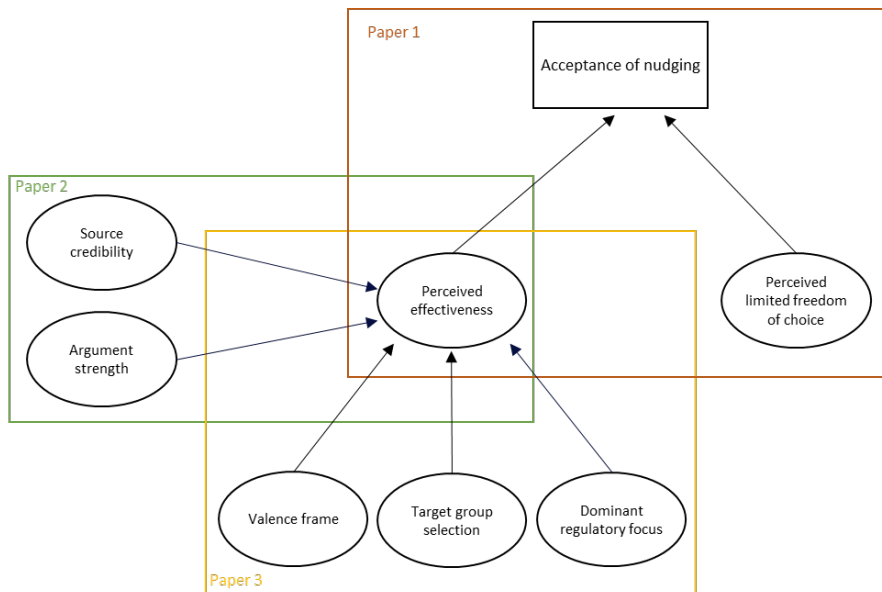


Figure 1 The papers in this thesis and how they are connected

*The papers in this thesis*

Table 1 Research agenda and contributions of the three research papers

Paper	Title	Main objective	Hypotheses	Design and sample	Main findings
I	If it works, I like it. Consumer acceptance of food-related nudging	Identify main drivers of acceptance of food-related nudges	Perceived effectiveness increases the acceptance of food-related nudges  Perceived limited freedom of choice (PLFC) reduces the acceptance of food-related nudges	Descriptive Cross-sectional survey (n=455)	Perceived effectiveness was positively associated with acceptance of food-related nudges  PLFC was negatively associated with acceptance of food-related nudges
II	Investigating young adults' perceived effectiveness of textual information about food-related nudging	Identify antecedents of perceived effectiveness of food-related nudges	Source credibility has a positive main effect on the perceived effectiveness of nudging (PEON)  Argument strength has a positive main effect on PEON  There is a positive interaction effect of source credibility x argument strength on PEON	Explanatory, causal 2 x 2 between-subjects factorial experiment (n=184)	There was no significant main effect of source credibility on PEON  Argument strength had a positive main effect on PEON  There was a positive interaction effect between argument strength and source credibility on PEON.
III	Win some, loose some: The effect of valence framing, target group selection and dominant regulatory focus on the perceived effectiveness of nudging	Identify antecedents of perceived effectiveness of food-related nudges	Information about nudging that focus on the health losses that its implementation will reduce will be perceived as more effective than the same information framed in gain terms  A nudge described as being beneficial to the reader's higher-order health goals will be perceived as more effective than one that assigns the same benefits to the general public  The more dominant the promotion oriented chronic regulatory focus, the higher PEON	Explanatory, causal 2 x 2 between-subjects factorial experiment (n=300)	Loss-framed messages yielded significantly higher PEON than gain-framed messages  There was no significant main effect of target group selection on PEON  Dominant promotion oriented regulatory focus yielded significantly higher PEON

Paper 1 is entitled “If it works, I like it: Consumer acceptance of food-related nudging”, and the objective of the paper was two-fold. First, we aimed to replicate the previously proposed association between perceived effectiveness (PE) and acceptance of nudging in a food-related context, and second, we aimed to extend the knowledge of factors influencing consumers’ acceptance of nudging by investigating the association between perceived limited freedom of choice (PLFC) and acceptance of nudging. We established a model and hypothesized that perceived effectiveness would be positively associated with acceptance of nudging, while perceived limited freedom of choice would be negatively associated with acceptance of nudging. The first paper applied a cross-sectional design, and the sample comprised a national representative selection of 455 Norwegian adults (18+). The association between PE, PLFC, and acceptance of nudging were measured for eleven different nudges and in line with our proposed hypotheses, PE was established as a positive predictor of acceptance for all of the investigated nudges, while PLFC served as a reducing factor of acceptance for all of the eleven nudges. PE was the strongest predictor of acceptance for all investigated nudges. Paper 1 was published online

in the *Journal of International Food and Agribusiness Marketing*, September 2019 (Djupegot and Hansen, 2019).

Paper 2 is entitled “Investigating young adults’ perceived effectiveness of textual information about food-related nudging”. The objective of paper 2 was to further increase our understanding of consumers’ acceptance of food-related nudging by shedding light on the antecedents behind the strongest and most reliable predictor of acceptance of nudging, namely perceived effectiveness of nudging (PEON). The paper explores how source credibility and argument strength influence the perceived effectiveness of textual information about food-related nudging. More specifically, source credibility and argument strength were hypothesized to have a positive main effect on PEON, and additionally, we hypothesized a positive interaction effect between source credibility and argument strength on PEON. A 2x2 scenario-based between-subjects factorial experiment with source credibility (high vs. low) and argument strength (high vs. low) as factors were designed to test the proposed hypotheses. The sample comprised 184 students, which was randomly assigned across the four experimental conditions. Respondents were presented a news-article which comprised information about nudging as a measure to facilitate healthy food choices and were thereafter asked to evaluate their perceived effectiveness of the measures mentioned in the text. Source credibility (high vs. low) and argument strength (high vs. low) varied between experimental conditions. No significant main effects were found for source credibility, but in line with our hypothesis, argument strength had a positive main effect on PEON, and finally, there was a positive interaction effect between source credibility and argument strength on PEON. Paper 2 was published in the *British Food Journal*, 122 (2), pp. 489-502 (Djupegot, 2019).

Paper 3 is entitled “Win some, loose some: The effect of valence framing, target group selection and dominant regulatory focus on the perceived effectiveness of nudging.” Paper 3 aims to further increase our

understanding of the association between perceived effectiveness and acceptance of food-related nudging, and the focus of the study was to explore how different message designs influence perceived effectiveness of food-related nudges. More specifically, we investigated how the valence frame and the target group of a message with information about nudging influence PEON, and furthermore, we explored the effect of the respondent's dominant regulatory focus on PEON. The aim was addressed by a 2x2 scenario-based between-subjects factorial experiment with valence frame (gain vs. loss) and target group (me vs. the public) as factors. Regulatory focus was measured by an adapted version of a previously established scale. Respondents were presented a text on the association between health, diet and non-communicable diseases, and a selection of nudges were introduced as measures to influence food-related choices and promote health. Valence frame (gain of health vs. loss of health) and target group selection (me vs. the public) varied between experimental conditions. After reading the text, respondents were asked to evaluate the perceived effectiveness of the nudges mentioned in the text, and data on consumer's regulatory focus was collected to investigate the effect of dominant regulatory focus on PEON. In order to ensure criterion validity, paper 3 also included a scale measuring acceptance of nudging. The sample of the study comprised 300 adults, which was randomly allocated across the four experimental conditions. Respondents exposed to the loss-framed message reported significantly higher PEON as compared to respondents exposed to the gain-framed message. No significant association was found between target group selection and PEON, but results showed that perceived effectiveness increased with dominant promotion oriented regulatory focus. The paper is submitted to *Food Policy* and is currently under review.

## **4 Methodological reflections**

The papers in this thesis apply a combination of different research methods to address the main objective. The methods applied in each of the studies are described in detail in the corresponding papers, and the focus of the current chapter is to provide methodological reflections both for each of the papers separately and for the three papers seen as a whole.

### ***4.1 Study designs and research approach***

The research approach in the current thesis is quantitative and the main logic of inquiry is a deductive approach. Combining different study designs allows highlighting the topic under study from different angles. Each design has its strengths and limitations, and the combination of different methods thus provides a broader perspective when addressing the objective of this thesis. As previously mentioned, the majority of studies within the area of consumer acceptance of nudging has been of a descriptive nature, applying cross-sectional designs to identify factors influencing acceptance. Paper 1 aims to investigate the predictive effect of perceived effectiveness and perceived limited freedom of choice on acceptance of nudging, and in this paper, we apply a cross-sectional survey design to explore the proposed associations. Cross-sectional designs are beneficial in terms of cost-effectiveness, yet although findings in the first study both replicated and extended existing knowledge about factors that influence consumer acceptance of nudging, the paper also has some methodological limitations. The application of a cross-sectional design limits the possibilities of drawing causal inferences, as establishing causal relationships requires a number of criteria to be met (Polit and Beck, 2014). First, the cause must precede the effect in time, second, there must be an association between the cause and the effect, and third, alternative explanations of the cause-effect

relationship should be ruled out (Polit and Beck, 2014). As the data for both predictors and outcomes are collected at the same time in paper 1, the first criteria of causal relationships cannot be met. Furthermore, it is highly difficult to rule out all possible alternative explanations in research within the social sciences. As such, the suggested causal relationship in paper 1 must be interpreted with care, though theoretical underpinnings and previous literature support the conclusions drawn in the paper.

Paper 2 and 3 aim to further increase our understanding of the theoretical and practical underpinnings of acceptance of nudging by shedding light on the antecedents behind one of the strongest and most reliable predictors of acceptance, namely perceived effectiveness. As indicated above, there has been a lack of experimental research within the domain of consumer acceptance of nudging, and the application of factorial experiments in paper 2 and 3 thus contributes to bridge this knowledge gap. Although the application of two factorial experiments in controlled settings should be considered as a step up in the evidence hierarchy, randomized controlled trials (RCTs) are perceived as the golden standard for testing causal relationships (Polit and Beck, 2014). RCTs postulates strict rules for testing causal relationships, and in addition to the abovementioned criteria, RCTs should also both be double-blinded and include control groups (Frankfort-Nachmias and Nachmias, 2008). Although RCTs are perceived as the golden standard, also this design has its limitations, and when testing real-world problems, RCTs might often come short due to the somewhat artificial nature of the design (Polit and Beck, 2014). Furthermore, as both people and behavior are dynamic (not static), knowing that you are part of a study might contribute to changed behavior, independent if you are part of an intervention- or control group. This mechanism is named the Hawthorne effect and might preclude the effect of the variables under study (Polit and Beck, 2014). When working with real-world problems, factorial experiments are therefore often a preferred design, particularly in the social sciences, and



compared with RCTs, factorial experiments are also better suited to test both main effects and interactions (Frankfort-Nachmias and Nachmias, 2008), analyses which are highly relevant for the research focus in the current thesis.

Another potential challenge in experimental studies is the issue of transferability of the results to the real world, i.e. the external validity of the findings. When designing the scenarios of both papers 2 and 3, efforts were therefore made to mimic real-world scenarios, and in paper 2, the scenarios were designed to look like screenshots from existing online news-sources. Furthermore, the text in the scenarios in paper 2 built on findings from existing literature, although names, places, and numbers were changed both to create a coherent story and pass manipulation checks, a process which is further described in chapter 4.3. In paper 3, information about dietary advice from the webpage of Health Norway was used as a basis for designing the scenarios, yet the valence frame and the target group were adapted to fit the context of the study. Although substantial efforts were made to mimic real-world scenarios in both of my experimental studies, the suggested effects should still be interpreted with care when translated into practice and the findings would also benefit from replication both within a food-related context and transferred to other behavioral domains.

## **4.2 *Ethical considerations***

The use of a cover story in paper 1 and scenario-based experiments in paper 2 and 3 causes some ethical considerations as the information offered to participants in this type of studies is not always a correct description of reality. To address this issue, the experiment in paper 3 ended with a debrief which informed participants that the text they had read was constructed for research purposes only. Although respondents for papers 1 and 2 knew that they participated in a research project, these

studies did not include such debriefs, and in hindsight, this could preferably have been done to avoid potential dissemination of incorrect information.

Furthermore, in paper 2 and 3, presenting the full-text scenarios used in the experiments, and not only describing how we designed them, could facilitate replication of my findings. However, a number of considerations have resulted in a decision to leave out the blueprint copy of the scenarios. Most importantly, in paper 2, I distinguish between high and low source credibility. The scenarios used in this paper contain the names of two existing informational sources that were found to differ significantly in credibility as providers of health information through manipulation checks. The names of these two sources have no theoretical interest, as it is the distinction in source credibility which is under study in the respective paper. Furthermore, this distinction in credibility only applies for the two sources as providers of health-related information, yet, the low credibility label might wrongly be perceived as counting for the source as a general information provider, a concern that also made me anonymize the low credibility source in the respective paper. Finally, all of the original scenarios were presented in Norwegian, and a pure translation of the scenarios to English without further validation might bring along contextual and semantic changes that are not accounted for, which might lead to an imprecise perception of what the scenarios conceptually covered. Based on the abovementioned considerations, I have decided to leave out the full-text copies of the scenarios, both in the papers and in this thesis, and have rather aimed to provide thorough descriptions of the scenarios as well as the difference between the experimental conditions in each of the papers respectively.

### ***4.3 Manipulation checks***

There might be differences between what is perceived to be a credible source and a high-quality argument from a scientific perspective and from a target group's perspective (Rucker and Petty, 2006). This implication became prominent when designing the experimental manipulation of source credibility and argument strength in paper 2. The operationalization of source credibility was finalized after the first round of manipulation checks, but for argument strength, the operationalization was somewhat more challenging. From a scientific perspective, there were major differences in the strength of arguments provided already from the first round of manipulation checks. Yet, the final operationalization of argument strength required several additional rounds of pre-tests, with small semantic changes from each round to the next before the high vs. low argument strength conditions were perceived to be significantly different by the target audience. This underlines the importance of running manipulation checks and supports the assumption that perceptions of high vs. low source credibility and argument strength should be found in the eyes of the target audience and not the researcher. In conclusion, it might be considered an important strength of paper 2 that manipulation checks were performed in a sample representative of the target audience before the final experiment was launched. Paper 3 did not include any manipulation checks due to the nature of the investigated factors. The factors in this particular paper were valence frame (gain vs. loss) and target group (me vs. the public), and as both gain vs. loss and me vs. the public are different by definition, manipulation checks were not required.

### ***4.4 Development and application of scales***

It is a common perception within the social sciences that the use of single-item measures might challenge reliability and validity, especially

when measuring latent constructs (Gliem and Gliem, 2003). Both acceptance, perceived effectiveness and perceived limited freedom of choice might be defined as latent constructs, and according to Gliem and Gliem (2003), these constructs should thus preferably be measured by a combination of several items. However, in a study published in the *Journal of Marketing Research*, Bergkvist and Rossiter (2007) investigated the predictive validity of multiple-item vs. single-item measures for a number of constructs, and the authors found no significant differences in the predictive validity of multi-item versus single-item measures. When starting the work on paper 1, the standard for operationalizing acceptance of nudging was to measure acceptance by dichotomous yes/no-questions (Reisch and Sunstein, 2016; Sunstein, 2016). The inclusion of a categorized seven-point Likert scale to measure acceptance in paper 1 might thus be seen as a development in this regard. However, in hindsight, paper 1 could also have included additional items per construct, as this would allow for reliability tests to be conducted.

Paper 2 and 3 further address the issue of reliability and validity of measures by including several items to measure both perceived effectiveness and acceptance of food-related nudges, and the final scales showed high reliability in both papers. Seen under one, the papers in the current thesis have contributed to pushing the measurement-standards within consumer acceptance of nudging further by suggesting additional items and new scales. However, the applied scales would benefit from further validation by means of cross-country- and cross-contexts comparisons. Finally, the lack of including a measure of acceptance of nudging in paper 2 might be considered a weakness since criterion validity for the proposed association between perceived effectiveness and acceptance of nudging could not be tested in this paper. However, both previous literature (Petrescu et al., 2016; Reynolds et al., 2019), and the findings in paper 1 and 3 lends support to the suggestion that perceived effectiveness of nudging influences acceptance. Nevertheless,

a measure of acceptance should preferably also have been included in paper 2, in order to ensure criterion validity.

#### **4.5 Data sets and sampling methods**

In total, this thesis comprises three individual sets of data, which combined includes a total of 939 responses that each contribute to increase our understanding of consumer acceptance of food-related nudging and the theoretical and practical underpinnings of this concept.

Table 2 Data sets and sampling methods

Paper	Sample size (total n=939)	Characteristics of sample	Sampling method
<b>I</b>	455	Student sample combined with national representative selection of Norwegians Mean age 39.4 years (range 18-79 years) Females 52%	Two-step process 1) Pen and paper 2) Digitally, via online marketing firm
<b>II</b>	184	Student sample recruited at Norwegian university Mean age 23.8 years (range 19-53 years) Females 51%	Pen and paper
<b>III</b>	300	National representative selection of Norwegians Mean age 48.8 (range 18-91 years) Females 51%	Digitally, via online marketing firm

Table 2 summarizes the characteristics of the samples and the sampling methods across the three research papers. In addition to the samples presented above, several manipulation checks have been performed in order to ensure reliable operationalization of the factors in the experiments, and the total number of collected responses for the papers in the current thesis is therefore somewhat higher. Sample size is a heavily debated topic within behavioral research (Knofczynski and Mundfrom, 2008), but a commonly applied rule of thumb is that each cell in factorial experiments should include a minimum of 30

respondents. Although all cells in the two experimental studies in the current thesis include above 30 respondents, the sample size particularly in paper 2, could preferably have been somewhat larger. The sample in paper 2 can also be criticized for only including student responses, but on the other hand, it is also relevant to ask if there are reasons to believe that student responses should differ from the rest of the population within this particular research area. As shown in table 2, the sample in paper 1 was recruited over a two-step process, where the first step included student responses only, and the second step included a national representative selection of Norwegians (18+). Comparisons of the responses between student- and nonstudent responses indicated no systematic differences, and the data in the two samples of paper 1 was therefore combined in the analyses. The comparisons of the responses between the two samples in paper 1 also holds important implications for the evaluation of the sample in paper 2, and the comparison of the results in the two samples in paper 1 supports the transferability of the findings in paper 2 to other population groups. This proposition should however be further addressed in future studies.

## 5 Results

Overall, the three papers in this thesis contribute to increase our understanding both of factors that are directly associated with consumer acceptance of food-related nudging, and of the underlying mechanisms explaining the perceived effectiveness of food-related nudging. The results are assessed in detail in the corresponding papers, and below I offer a summary of the findings, accompanied by a modified version of figure 1, which illustrates the overall investigations that have been conducted to address the main objective of this thesis. The modified version of figure 1 provides a somewhat simplified visual overview of the results of the hypothesized associations across the three research papers, where solid lines illustrate significant associations and stippled lines illustrate non-significant associations. Additional findings on control-variables are only commented on in the text.

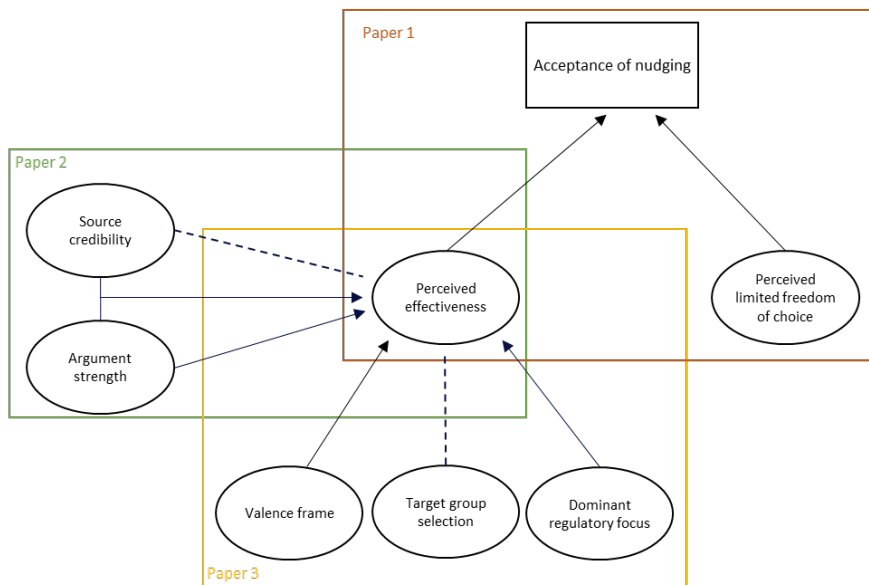


Figure 2 Overall findings across the three research papers

As illustrated in figure 2, perceived effectiveness and perceived limited freedom of choice were identified as significant predictors of acceptance of food-related nudging, and more specifically, perceived effectiveness served as a positive predictor, while perceived limited freedom of choice served as a reducing factor for all of the eleven investigated nudges. Furthermore, argument strength (high vs. low), valence frame (gain vs. loss) and dominant regulatory focus (promotion vs. prevention) were significantly associated with perceived effectiveness of food-related nudges. High argument strength, loss-framed messages, and promotion oriented regulatory focus were positively associated with perceived effectiveness of nudging. In addition, there was a positive interaction effect between argument strength and source credibility on the perceived effectiveness of nudging. No significant effect was found for source credibility (high vs. low) or target group selection (me vs. the public).

In addition to the hypothesized associations, gender was included as a control variable in paper 1 and 3. In paper 1, women reported consistently higher support of all nudges as compared to men, though the difference was only significant for certain nudges. The analyses in paper 3 revealed a main effect of gender on perceived effectiveness of food-related nudges, where the perceived effectiveness was significantly higher among women as compared to men. Finally, self-assessed knowledge of diet and health and the importance of food in life were included as covariates in the proposed model of paper 2, but no significant findings were identified.



## 6 Discussion

This chapter opens with an overall discussion of the findings of this thesis. The findings are discussed in light of existing literature in the corresponding papers, and to avoid a too detailed iteration of the discussion in my papers, the chapter below rather seeks to summarize the overall findings across the three papers and to provide implications for policy-makers. Thereafter follows a discussion of the contributions of the current thesis, and the discussion-chapter closes by suggesting some fruitful paths for future research within the area of consumer acceptance of nudging.

### *6.1 Findings and implications for policy-makers*

The main objective of this thesis was to increase our understanding of consumer acceptance of food-related nudging. The objective was approached by a two-fold perspective which aimed to 1) identify main drivers of acceptance of food-related nudging, and 2) to shed light on the antecedents behind one of the main drivers of acceptance of food-related nudging, namely perceived effectiveness of nudging. The first paper was dedicated to identifying factors that are directly associated with acceptance of food-related nudging, and the objective was approached by examining the predictive effect of perceived effectiveness and perceived limited freedom of choice on acceptance of eleven different food-related nudges. In line with findings in previous literature (Diepeveen et al., 2013; Cornwell and Krantz, 2014; Petrescu et al., 2016; Marteau, 2017; Bang et al., 2018; Cadario and Chandon, 2019), the positive association between perceived effectiveness and acceptance of nudging was replicated in a food-related context, and furthermore, perceived limited freedom of choice was identified as a negative predictor of acceptance, thus contributing to close a previously identified

gap in the literature (Petrescu et al., 2016). Also, previous research suggested a tendency for consumers to prefer system 2 over system 1 nudges (Sunstein, 2016), but this finding was not supported in paper 1. This finding might be an indication that it is the perceived effectiveness and intrusiveness of the nudge and not the psychological underpinnings that explain consumer opinions about nudging.

Although the strong association between perceived effectiveness and acceptance of nudging were replicated in the current thesis, the first take-home message for policy-makers is that the goal never should be to influence the publics' perceived effectiveness of nudges in order to get them to accept them. Testing the actual effectiveness of nudges should always take place before considerations on acceptance becomes prominent, an issue which is further discussed in chapter 6.3. Also, findings in paper 1 indicate that perceived limited freedom of choice reduces acceptance of nudging, which is important to consider when considering implementing nudges that are intrusive by nature. Moreover, nudging brings a new measure to the marketplace which fills a gap in the policy-makers toolbox within certain behavioral domains (like the food-related one). Still, this does not imply that all public behaviors would benefit from being nudged, and as outlined in chapter 2.1, there are several behavioral domains where traditional policies should be the preferred option. Thus, balancing insights from behavioral public policy with traditional policy tools would probably be the preferred approach for policy-makers which aim for happy citizens and successful policy implementation. Also, as outlined above, most people agree on the benefits of having a healthy diet, and policy-makers should be aware that it might be more challenging to facilitate public support of nudges within more controversial behavioral domains, like the reduction of CO<sub>2</sub>-emissions or increasing the number of organ donors.

Knowing that perceived effectiveness is an important driver of acceptance of nudging, has limited value if we lack knowledge about how information about effectiveness should be most successfully

communicated. Findings both in previous literature and in paper 1 indicated a need to expand the causal chain backward and explore the antecedents of perceived effectiveness of nudging. Papers 2 and 3 aimed to bridge this knowledge gap, by focusing on how different message designs influence the perceived effectiveness of food-related nudging. Overall, my thesis has identified how a number of aspects related to 1) the message, 2) the sender of the message and 3) the receiver of the message respectively, influence perceived effectiveness of food-related nudging.

In total, the research papers in this thesis investigated how three aspects related to the message, namely argument strength (high vs. low), valence frame (gain vs. loss) and target group selection (me vs. the public) respectively, influenced the perceived effectiveness of food-related nudging. The results showed that both argument strength and valence frame had significant main effects on the perceived effectiveness of nudging, with messages with high argument strength and loss-framed valence being perceived as most effective. No significant effect was found for target group selection. Based on these findings, policy-makers should make sure that the arguments offered for the expected effects of nudging are of high strength, and potential effects should also focus on the health losses that implementation of nudges can prevent, while the choice of target group is of minimal importance. However, it is important to underline that the effect of argument strength, valence frame, and target group selection on the perceived effectiveness of nudging has not been tested in the same study, and policy-makers should be aware that possible interaction effects between these variables might occur. Furthermore, policy-makers need to pre-test the strength of arguments by the target audience due to the previously proposed distinction between what is perceived to be a high-quality argument from a scientific versus a target group's perspective (Rucker and Petty, 2006).

Source credibility (high vs. low) was the only factor that was investigated within the overarching category of aspects related to the sender of the

message. Although manipulation checks demonstrated significant differences between the perceived credibility of the two investigated sources, no significant difference was found between high and low source credibility on the perceived effectiveness of nudging. Yet, there was a significant positive interaction effect between source credibility and argument strength which demonstrates that if policy-makers lack high-quality arguments about expected effects of nudging, the perceived effectiveness might be enhanced if the information is communicated by a high credibility source. On the other hand, if arguments about expected effects are of high quality, source credibility is of limited importance. Also, it is important to note that both of the investigated sources in the current thesis can objectively be perceived to be of relatively high credibility, and based on findings in previous literature (Pornpitakpan, 2004), it is reasonable to assume that significant main effects for source credibility could have been found by applying stronger manipulations.

Finally, this thesis explored how four different aspects related to the receiver, namely gender, dominant regulatory focus (prevent vs. promote), self-assessed knowledge of diet and health and importance of food in life, respectively, influenced the perceived effectiveness of food-related nudging. Overall, no significant effects were found for self-assessed knowledge of diet and health or the importance of food in life, while significant results were found for both dominant regulatory focus and gender. Perceived effectiveness of nudges increased with dominant promotion oriented regulatory focus. Previous studies have investigated how a selection of personality characteristics influence attitudes towards nudging (Hagman et al., 2015; Jung and Mellers, 2016), but to the best of my knowledge, no previous studies have focused on the effect of regulatory focus on perceived effectiveness of nudging. The findings on regulatory focus thus contribute to increase our understanding of the antecedents of perceived effectiveness of nudging, and for policy-makers, the findings imply that acceptance of nudging might be easier to

achieve among promotion-oriented consumers, while stronger resistance should be expected for prevention-oriented consumers.

Previous research has reported somewhat inconsistent associations between gender and acceptance of nudging, with some studies reporting higher support of nudging among women (Diepeveen et al., 2013; Reisch et al., 2017; Hagmann et al., 2018), and other studies reporting no gender differences in acceptance of nudging (Petrescu et al., 2016). In the current thesis, both acceptance- and perceived effectiveness of nudging were shown to be higher among women than men. Although the effect of gender on both perceived effectiveness- and acceptance of nudging should be further scrutinized in future research, the current thesis has contributed to clarifying the association between gender, PE and acceptance of food-related nudging and the findings indicates that policy-makers should be aware that men might be more inclined to reject food-related nudges as compared to women.

## **6.2 Contributions**

This thesis contributes to increase both theoretical, empirical and methodological knowledge within the research area of consumer acceptance of food-related nudging. When considering the trustworthiness, contribution, and quality of the research findings, methodological strengths and weaknesses should always be considered, and as a reminder to the reader, methodological reflections are offered in chapter 4. The current chapter seeks to summarize the overall contributions of this thesis. Firstly, this thesis strengthens and extends our understanding of factors that are directly associated with acceptance of food-related nudging. Previous research indicates perceived effectiveness to be a strong and reliable predictor of acceptance of different types of public policy, and this finding is replicated in the context of food-related nudging in the current thesis. Furthermore, the

investigation of the association between perceived limited freedom of choice and acceptance of nudging constitutes a theoretical development in our understanding factors directly associated with acceptance of nudging and closes a gap in the literature on this association. Furthermore, to the best of my knowledge, no previous studies have investigated acceptance of nudges in a Norwegian population, and the current thesis thus cross-country validates the previously established association between perceived effectiveness and acceptance of nudging in a Norwegian context.

Secondly, this thesis offers a novel perspective to understand consumer acceptance of food-related nudging by expanding the causal chain backward and shedding light on the underlying mechanisms of the perceived effectiveness of food-related nudging. Previous studies have identified a number of factors associated with acceptance of nudging, yet there has been limited understanding of the underlying mechanisms of these factors. This means that although perceived effectiveness has been established as the strongest and most reliable predictor of acceptance of nudging, knowledge about the most effective way to communicate evidence of effectiveness has been limited (Reynolds et al., 2019). This thesis addresses this knowledge gap and contributes not only to increase our theoretical understanding of factors that directly influence acceptance of nudging but also by focusing on how different message designs influence consumers' perceived effectiveness of food-related nudging. Overall, the findings of this thesis provide guidance to policy-makers on how different aspects of nudge-related information influence consumer opinions about food-related nudging, but the findings would benefit from replication in future studies.

When starting the work on this thesis, the body of knowledge within the area of consumer acceptance of nudging indicated a lack of experimental research. This thesis includes two experimental studies, which explore the causal relationship between a number of factors and the perceived effectiveness of nudging. Although the findings should be interpreted

with care until replicated, the inclusion of two experimental studies contributes to moving the knowledge about consumer acceptance of nudging one step up in the evidence hierarchy. Finally, the current thesis also provides increased methodological knowledge to the area of consumer acceptance of nudging by providing new and reliable scales to measure both acceptance and perceived effectiveness of nudging in a food-related context.

### **6.3 *Future directions***

An important strength of the current thesis is the triangulation of methods, data sources and use of theories, which enabled me to approach the overall objective from several angles. Still, several research gaps remain, and the current chapter points at some fruitful paths for future research within this area. The current thesis expands the theoretical and practical understanding of consumer acceptance of food-related nudging by exploring factors that are directly associated with acceptance, and by investigating the underlying mechanisms of the strongest and most reliable predictors of acceptance, namely perceived effectiveness of nudging. Yet, perceived limited freedom of choice was also identified as an important predictor of acceptance in the current thesis, but knowledge of the underlying mechanisms of this predictor remains unexplored. Investigating how the perception of limited freedom of choice associated with the implementation of nudging might be prevented could thus be a fruitful avenue for future research.

This thesis has contributed to increase the knowledge of the factors that influence consumer acceptance- and perceived effectiveness of food-related nudging. Still, as outlined above, previous research indicates that the actual effectiveness of nudging seems to be highly context-dependent (Arno and Thomas, 2016; Sunstein, 2017; Holmes, 2018). Although nudging as a policy tool has the seemingly perfect design to tackle

challenges within several behavioral domains, this is not necessarily synonymous with all nudges being effective. Within the practical implementation of behavioral public policy, it is again important to underline that examination of the actual effect of nudges always needs to be pre-tested before focusing on consumer opinions about the nudge becomes relevant. Based on this, future studies should scrutinize the effect of different nudges as measures to influence food-related behavior in order to identify which nudges that are most effective in creating behavioral change.

Although I have investigated how a number of message designs influence the perceived effectiveness of food-related nudges, investigation of all factors has not been done within the same study. An interesting inquiry would thus be to explore the effect of all the proposed associations within the same study, and furthermore, application of structural equation models to test the association between all variables examined in this thesis would be an interesting exercise to test the overall quality of my findings. Finally, this thesis has focused on acceptance of nudging within the context of food-related behavior in Norwegian samples and attempts to replicate the findings in other contexts and populations would contribute to further validate the results.



## **7 Concluding remarks**

The main objective of this thesis was to increase our understanding of consumer acceptance of food-related nudging, and the objective was approached by a two-fold perspective. First, this thesis aimed to investigate the main drivers of acceptance of food-related nudging. The findings showed that acceptance of food-related nudging is influenced by 1) the perceived effectiveness of the nudge and 2) the perceived limited freedom of choice associated with the nudge, with perceived effectiveness being the main driver of acceptance. Second, this thesis aimed to shed light on the underlying mechanisms of the strongest and most reliable predictor of acceptance of nudging, namely the perceived effectiveness of nudging. The findings demonstrated that a number of aspects related to 1) the sender, 2) the message and 3) the receiver influenced the perceived effectiveness of nudging. Conclusively, this thesis provides an increased understanding of consumer acceptance of food-related nudging. The results lend additional support to the pivotal role of consumers' perceived effectiveness of nudging in relation to acceptance and digs deeper into the theoretical and practical underpinnings of consumer acceptance of food-related nudging.

*Concluding remarks*

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# **Paper 1**

*Paper 1*

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Djupegot, I.L. & Hansen, H. (2019): If It Works, I like It: Consumer Acceptance of Food-Related Nudging, *Journal of International Food & Agribusiness Marketing*, DOI: 10.1080/08974438.2019.1668325

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## **Paper 2**

Djupegot, I.L. (2019), "Investigating young adults' perceived effectiveness of textual information about food-related nudging", *British Food Journal*, Vol. 122 No. 2, pp. 489-502.

# Investigating young adults' perceived effectiveness of textual information about food-related nudging

Ingrid Laukeland Djupegot

*Faculty of Social Science, Norwegian School of Hotel Management,  
University of Stavanger, Stavanger, Norway*

## Abstract

**Purpose** – Perceived effectiveness of nudging has been established as one of the most reliable predictors of acceptance of nudging. The purpose of this paper is to investigate how source credibility and argument strength influence the perceived effectiveness of textual information about food-related nudging in order to provide a better understanding of how acceptance of nudging may be facilitated.

**Design/methodology/approach** – A 2 × 2 scenario-based between-subjects factorial experiment with source credibility (high vs low) and argument strength (high vs low) as factors was applied. Data on respondents' level of involvement in food-related behaviour were also collected.

**Findings** – Argument strength had a positive main effect on the perceived effectiveness of nudging, and there was a significant positive interaction effect of source credibility × argument strength on the perceived effectiveness of nudging.

**Practical implications** – The findings of this paper provide policy makers and other decision makers with a better understanding of how information about nudging should be communicated to consumers in order to facilitate acceptance.

**Originality/value** – This paper is one of the first to investigate how information about nudging should be communicated to consumers in order for nudging to be perceived as an effective and thus acceptable measure to influence food-related behaviour.

**Keywords** Experiment, Food policy, Consumer behaviour, Acceptance of nudging, Perceived effectiveness of nudging

**Paper type** Research paper

## Introduction

Nudging has emerged as an innovative behavioural tool to influence consumer choice in areas varying from pension- and energy saving, to organ donation and food choice (Thaler and Sunstein, 2008; Hollands *et al.*, 2017). Nudging was introduced as a term by Thaler and Sunstein in their book “Nudge” (2008), and is defined as “any aspect of the choice architecture that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives” (Thaler and Sunstein, 2008, p. 6). Somewhat simplified, nudges are initiatives that guide people’s behaviour in a particular direction without removing or forbidding the alternatives (Sunstein, 2018). The theoretical base of nudging has been covered in previous literature (see e.g. Thaler and Sunstein, 2008; Marteau *et al.*, 2011; Marchiori *et al.*, 2017), but in short nudging builds on principles from behavioural economy, social- and cognitive psychology (Marteau *et al.*, 2011; Marchiori *et al.*, 2017), and the psychological underpinnings of nudging is largely based on theories of dual-process reasoning (Kahneman, 2011; Marchiori *et al.*, 2017). Nudging has become a particularly popular measure within food-related behaviour (Hollands *et al.*, 2017; Bauer and Reisch, 2019), and nudges to influence food choice typically include interventions that alter availability, position, presentation, size or information, either of the food products itself, of objects related to the food products, or in the wider environment where the food products are presented (Hollands *et al.*, 2017). Alteration of product placement, e.g., by

making products more or less visible, reducing plate sizes to reduce portion sizes and labelling food products with keyholes or traffic lights signalling nutritional quality are typical examples of nudges that have been applied to influence food-related behaviour (Bauer and Reisch, 2019).

The Nuffield Council on Bioethics (2007) has provided a report on ethical issues in public health, where they introduce an intervention ladder for categorising interventions in health policy based on potential benefits and level of intrusiveness. The ladder ranges from doing nothing (least intrusive) to eliminating choice (most intrusive), and nudging falls midway on this ladder. Despite this, nudging has been criticised for undermining consumer autonomy, and the establishment of governmentally funded nudge-units in several countries has given heat to a debate on the ethical aspect of nudging, where governments have been criticised for being paternalistic nanny-states that interfere with people's freedom to choose (Blumenthal-Barby and Burroughs, 2012; Schmidt, 2017; Sugden, 2017). This critique has fostered a line of research investigating consumers acceptance of nudging (Hagman *et al.*, 2015; Jung and Mellers, 2016; Petrescu *et al.*, 2016; Reisch and Sunstein, 2016; Sunstein, 2016; Reisch *et al.*, 2017; Hagmann *et al.*, 2018; Hall *et al.*, 2018; Loibl *et al.*, 2018; Cadario and Chandon, 2019; Djupegot and Hansen, 2019), and the findings indicate that acceptance depends on a number of factors, including consumers nationality, the target behaviour (what is nudged), the type of nudge (e.g. changing the default option vs altering placement of candy and fruit), the perceived intrusiveness of the nudge, the target group (who is nudged) and the context of application (e.g. in a public cafeteria vs in a food store). In example, Reisch *et al.* (2017) studied the support of nine health-related nudges in six European countries, where overall findings indicate relatively high levels of support. Yet, a more detailed look at the results shows substantial differences in acceptance dependent on respondent's nationality and type of nudge, as support for nudges to reduce childhood obesity are above 80 per cent in all countries, while nudges that discouraged individuals from smoking and overeating vary in support from 35 to 77 per cent. Several studies have tried to reveal underlying factors that explain acceptance of different types of nudging, and perceived effectiveness has been established as one of the most reliable predictors of acceptance (Diepeveen *et al.*, 2013; Petrescu *et al.*, 2016; Marteau, 2017; Bang *et al.*, 2018; Hall *et al.*, 2018; Cadario and Chandon, 2019; Djupegot and Hansen, 2019). Based on the established association between perceived effectiveness and acceptance of nudging, it is reasonable to assume that information about effectiveness may be used to facilitate acceptance. Yet, there is limited knowledge about how the perceived effectiveness of nudging may be enhanced (Djupegot and Hansen, 2019), and increased knowledge about factors that influence consumers' perceived effectiveness of nudging may guide policy makers on how information about nudging should be communicated to consumers. On this basis, the objective of the current study is to investigate factors that influence the perceived effectiveness of food-related nudging. The objective as well as more detailed hypothesis are further outlined in the subsequent sections.

## **Theoretical background**

### *Creating persuasive messages*

Persuading a consumer about a product or message's effectiveness might determine the success or failure of implementing a new product or policy, and how information is communicated has a large impact on how it is perceived by the recipients (Rucker and Petty, 2006). Sometimes, strong arguments are needed to persuade consumers about effectiveness, yet other times it might be enough that the information is communicated by a credible source or in a credible context. Substantial efforts have been invested to examine how the risks associated with unhealthful behaviours should be effectively communicated (Schmidt *et al.*, 2016), and much of the knowledge within this topic builds on principles from attitudes



and persuasion research (Rucker and Petty, 2006). The perceived effectiveness of nudging is a perception-based outcome, and research on persuasion and attitudes is therefore also highly relevant to identify how this may be influenced. Research on attitudes and persuasion has developed alongside the field of social psychology since the early 1950s (Briñol and Petty, 2012), and persuasion research has identified a range of different factors that might influence the process of persuasion. Although there are many different persuasion theories, most research investigating the process of persuasion evolve around four core factors, namely the source (e.g. source credibility), the message (e.g. argument strength), the recipient (e.g. personal factors like need for cognition and emotional state when information is received) and the context (e.g. in a newspaper vs a scientific journal or health information delivered in an educational health programme vs on a leaflet in the mail-box) (Pornpitakpan, 2004; Briñol and Petty, 2012). As findings from the current paper can be used to inform policy makers and other decision makers on how to best communicate information about the effectiveness of nudging in order for such measures to be publicly accepted, there is a need to focus on the factors that can be controlled by the initiators. The focus of the current study is therefore to investigate how the source and the message influence the perceived effectiveness of food-related nudging.

#### *The source and the message in persuasive communication*

The persuasive effect of the source of information is often associated with the perceived credibility of the source, and furthermore, credibility may be influenced by the source's perceived expertise and trustworthiness (Pornpitakpan, 2004; Schmidt *et al.*, 2016). Source credibility is one of the most researched variables within persuasive communication, and in a review of the past five decades of research on source credibility, Pornpitakpan (2004) concludes that a high credibility source is perceived to be more persuasive than a low credibility source. Consumer's perception of who or what is perceived to be a credible source of information may however differ both between individuals and also across the lifespan (Kruglanski, 2012). To use what is objectively perceived to be a high credibility source from a researcher's perspective might therefore have the opposite effect of the intended (Petty and Briñol, 2012; Pechmann and Catlin, 2016). Thus, although it is reasonable to assume that a health claim will be perceived to be less credible if you read it on a commercial fitness blog vs on the website of your local health authorities, and that nudging will be perceived to be more effective when information about the effect is presented by a researcher as compared to a lay person, the somewhat unambiguous findings on the effect of source credibility underline a need to pre-test the perceptions of source credibility with the target audience in order to avoid unintended effects (Pornpitakpan, 2004).

The persuasive effect of a message is often associated with the perceived quality of the arguments (Petty and Briñol, 2012). Perceived quality of arguments may be influenced by a number of factors, including ease of understanding, complexity and familiarity, and strong arguments should be designed to facilitate thoughts in favour of the presented information (Petty and Briñol, 2012). Also for argument strength, there might be differences between what is perceived to be a strong argument from a scientific perspective, and what is perceived to be a strong argument from a consumer's perspective (Rucker and Petty, 2006). Providing quantitative information about the effect of a measure often contributes to higher perceived argument quality, and detailed information and arguments may be perceived to be of higher quality than less detailed information (Chaiken and Ledgerwood, 2012). Still, when considering information for a short period, consumers may have problems transforming detailed and numerical information into an understandable and relevant size, and furthermore, because biased thinking often occurs when people evaluate probability and risk, the framing of information might influence how the content is perceived (Kahneman, 2011; Oppenheimer and Kelso, 2015). This implies that providing the

information that a given measure has the potential to reduce overweight in the society with 5 per cent might be perceived differently than if these 5 per cent are translated into the number of people they correspond to in a given population (e.g. 250,000 fewer people with overweight). When information about effectiveness of nudging is provided, it may therefore not be sufficient to provide high-quality arguments about effectiveness if the information is not adapted to fit the target audience.

Following the proposed effects of source credibility and argument strength in the preceding paragraphs, it is reasonable to assume that a message that combines strong arguments with a credible source will contribute to increase the persuasive effect of a message significantly more than including either strong arguments or using a credible source separately. However, information may be perceived differently depending on the format of the message and the mode of delivery (Decrop, 2007). This implies that information from a credible source may be perceived differently if the message is presented in a textual format in a newspaper that only refers to material from the source vs in aural format via radio or in a podcast where you can hear the voice of the person that presents the information. When investigating how the source and the message influence the perceived effectiveness of nudging, the format of messaging and the mode of delivery therefore have to be considered as this may influence how the content is perceived. As previously mentioned, studies have found that a seemingly simple variable, such as source credibility, does not necessarily have a straightforward effect on persuasion, and in some studies, this is explained by consumers' level of involvement in the outcome (Petty and Briñol, 2012). Level of involvement may depend on a number of factors, including consumers' interest, motivation, knowledge and ability. When aiming to identify factors that influence the perceived effectiveness of food-related nudging, this implies that consumers' interest and motivation to follow the intended outcome of a nudge, as well as their knowledge and ability to achieve this outcome, may influence how information about nudges to promote healthy eating is perceived. A consumer with low interest in healthy eating may have low motivation and/or ability to consider the accuracy of information about the effectiveness of food-related nudges. A coping strategy may therefore be to focus on the parts of the information that one feels qualified to evaluate, like the credibility of the source that presents the information (Rucker and Petty, 2006; Petty and Briñol, 2012). A consumer with a high interest in healthy eating, on the other hand, may instead focus on the content when presented information about the effectiveness of food-related nudges (Petty and Briñol, 2012), and arguments about effectiveness as well the credibility of the source are therefore potentially critically evaluated. High quality of arguments in combination with high source credibility may therefore be necessary in order to be accepted as a valid proof of effectiveness.

Young adults are an important group for non-communicable disease prevention, and increasing knowledge about the perceived effectiveness of nudging in this consumer segment may guide policy makers and other decision makers on how information about nudging should be communicated in the future. In most countries, public health information is still mainly delivered in textual format, either on paper or online, and investigating how source credibility and argument strength influence the perceived effectiveness of textual information about food-related nudging is therefore the focus of the current paper. The following hypotheses are proposed:

- H1.* Source credibility has a positive main effect on the perceived effectiveness of textual information about food-related nudging.
- H2.* Argument strength has a positive main effect on the perceived effectiveness of textual information about food-related nudging.
- H3.* There is a positive interaction effect of source credibility and argument strength on the perceived effectiveness of textual information about food-related nudging.

## Methods

### *Design and procedure*

To address the hypotheses proposed in the current study, a  $2 \times 2$  scenario-based between-subjects factorial experiment with source credibility (high vs low) and argument strength (high vs low) as factors was applied. The experiment was designed in the format of an online news-article, and was presented on an A4 sized page across all of the four experimental conditions. The article opened with a recent statistic indicating that overweight and obesity is an increasing problem in Norway, followed by objectively presented information about the increased focus on external factors as a promising approach to facilitate healthy food choice. More visible placement and labelling of healthy food products in food stores and supermarkets, and a reduction of plate sizes in public cafeterias, hotels and schools subsidised by the government were mentioned as examples of possible measures to facilitate healthy food choice. Nudging was not explicitly used as a term in the text, and source of the article and argument strength was the only information that differed between experimental conditions. Source credibility (high vs low) was operationalised by manipulating the source of the news-article. The web-page of The Norwegian Public Health Institute (FHI) was used in the high source credibility condition, while the web-page of one of the most popular online newspapers in Norway was used in the low source credibility condition. Argument strength (high vs low) was operationalised by manipulating the content of the news-article. The high argument strength condition included quantitative information about the expected effects of implementing the abovementioned initiatives, and this version also referred to high-quality research findings as a basis for implementing this type of measures. The low argument strength condition presented the same measures as a means to facilitate healthy food choices, but this version had limited information about expected effects and no mention of research.

Both factors were subject to manipulation checks before conducting the final experiment. Source credibility (high vs low) was pre-tested in a sample of 41 respondents. The sample was split into two groups, where half of the respondents were asked to evaluate the credibility of FHI as a provider of information about health and diet, and the other half were asked to evaluate the credibility of the newspaper as a provider of information about health and diet. Respondents rated their agreement with the statement “I think (source) is a credible source to information about health and diet [...]” on a seven-point Likert scale anchored “Totally disagree” and “Totally agree”. Argument strength (high vs low) was pre-tested in a sample of 66 respondents. The source of the article was removed, and the sample was split into two groups (high vs low argument strength). Respondents were asked to read a text and thereafter to evaluate the strength of the arguments presented for the effect of the measures mentioned in the text. Respondents rated strength of the arguments by the statement “The arguments for implementing this type of measures are [...]” on a seven-point Likert scale, anchored “weak” and “strong”. Results of the manipulation checks are presented in Table I.

The perceived effectiveness of textual information about nudging was measured by a five-item scale. Development of items built on previous literature investigating perceived effectiveness as a predictor of acceptance of public policy and nudging (Cornwell and Krantz, 2014; Pechey *et al.*, 2014; Petrescu *et al.*, 2016) and was adapted to fit the objective of

**Table I.** Manipulation checks performed by individual sample t-tests

Condition	Source credibility		Argument strength	
	High ( $n = 23$ )	Low ( $n = 18$ )	High ( $n = 29$ )	Low ( $n = 37$ )
Mean (SD)	5.2 (1.5)	2.7 (1.4)	5.2 (1.2)	4.0 (1.7)
	$t(39) = -5.4, p < 0.001$		$t(64) = -3.3, p = 0.002$	

the current study. The scale captured different aspects of the perceived effectiveness of the nudges mentioned in the news-article. Some of the questions asked directly how respondents perceived the effectiveness of the measures mentioned in the text, while others asked about the perceived effectiveness of such measures as a tool to influence respondent's own diet, respondent's friends diet and the public's diet overall. All items were measured on a seven-point Likert type scale anchored "Totally disagree" and "Totally agree", and an overview of the items are provided in Table II.

Although not specified in the hypotheses, theoretical assumptions outlined in the previous sections indicated a need to control for consumer's level of involvement. As the concept of involvement in the current study might both be related to consumer's knowledge, ability, interest and motivation in food-related behaviour, a scale capturing different aspects of consumer's involvement was included and counted eight items. Three of these items measured respondent's self-assessed knowledge of diet and health. These items were largely inspired by Park *et al.* (1994) "Self-assessed knowledge scale", although items were adapted to fit the research context of the current study. Five items measured respondent's interest and motivation in food and food-related behaviour. These items were adapted from "The importance of food in life-scale", which is a subscale of "The food attitudes survey" developed by Rozin *et al.* (1999). The original scale includes seven items, but as two of the items in the original scale were not relevant to the context of the current paper, these were excluded.

### *Sample and data analysis*

The sample of the current study included 184 students, recruited at a Norwegian university. Of all, 49 per cent of students were male and the mean age was 23.8 years (SD = 5.3). The sample included respondents with different academic backgrounds, including students from both technology, natural sciences and social sciences. Some of the respondents were invited to take part in the research project during a lecture, while others were recruited in the student cafeteria and the library. The majority of the respondents were undergraduates, and data collection continued over several days. Each participant was randomly assigned across the four experimental conditions and was given a paper booklet that included the scenario story, the scale measuring the perceived effectiveness of nudging and the scale measuring

**Table II.** Items included in scales

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#### *The perceived effectiveness of nudging<sup>a</sup>*

1. The measures mentioned in the article are an effective way of influencing the public's diet
2. The measures mentioned in the article facilitate healthy food choice
3. The measures mentioned in the article will not influence the public's diet (r)
4. The measures mentioned in the article will probably influence my diet
5. The measures mentioned in the article will probably influence my friend's diet

#### *Involvement*

##### Self-assessed knowledge<sup>b</sup>

1. Compared to my friends, I have good knowledge of diet and health
2. Compared to an expert, I have good knowledge of diet and health
3. Generally, my knowledge of diet and health is good

##### Importance of food<sup>c</sup>

1. Enjoying food is one of the most important pleasures of my life
2. I would rather eat my favourite meal than watching my favourite television show
3. I think about food in a positive anticipatory way
4. Money spent on food is money well spent
5. If I could satisfy my nutritional needs safely, cheaply and without hunger by taking a daily pill, I would do this

**Sources:** <sup>a</sup>Self-constructed; <sup>b</sup>Adapted from Park *et al.* (1994); <sup>c</sup>Adapted from: Rozin *et al.* (1999)

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involvement in outcome. All multi-item scales were validated by the use of factor analysis with maximum likelihood extraction and direct oblimin rotation. Items precluding a unidimensional factor structure were removed, and this applied to one item in the importance of food scale and one item in the perceived effectiveness of nudging scale. Final scales thus included three items measuring self-perceived knowledge, four items measuring the importance of food and four items measuring the perceived effectiveness of nudging. Summarised indexes were constructed, and Cronbach's  $\alpha$  tests were performed to ensure the reliability of the scales. Results of factor analysis and reliability tests are reported in Table III, and descriptive data for summarised indexes are reported in Table IV. Univariate analysis of variance (General Linear Model) was used to test  $H1-H3$ , and individual  $t$ -tests were used to further investigate differences between the four experimental conditions.

## Results

Descriptive data across the four experimental conditions are provided in Table V, and univariate analysis of variance is provided in Table VI.  $H1$  suggested a positive main effect of source credibility on the perceived effectiveness of textual information about food-related nudging, but this was not supported ( $F(1, 180) = 0.936, p = 0.335$ ).  $H2$  suggested a positive main effect of argument strength on the perceived effectiveness of textual information about food-related nudging, and this was supported ( $F(1, 180) = 5.295, p = 0.023$ ). Finally,  $H3$  suggested a positive interaction effect of source credibility and argument strength on the perceived effectiveness of textual information about food-related nudging. This was supported, although the effect was only borderline significant ( $F(1, 180) = 4.054, p = 0.046$ ).

**Table III.** Factor analysis and reliability tests for items included in summarised indexes

Item	Factor loading	Cronbach's $\alpha$
Self-assessed knowledge 1	0.884	0.890
Self-assessed knowledge 2	0.768	
Self-assessed knowledge 3	0.850	
Importance of food 1	0.575	0.797
Importance of food 2	0.590	
Importance of food 3	0.624	
Importance of food 4	0.589	
Perceived effectiveness of nudging 1	0.655	0.838
Perceived effectiveness of nudging 2	0.596	
Perceived effectiveness of nudging 4	0.837	
Perceived effectiveness of nudging 5	0.898	

**Table IV.** Descriptive data for summarised indexes

Index	Mean	SD	$N$
Perceived effectiveness of nudging	3.41	1.23	184
Self-assessed knowledge	4.46	1.29	184
Importance of food	4.97	1.21	182

**Table V.** Descriptive data for the perceived effectiveness of nudging across experimental conditions

Source credibility	Argument strength	Mean	SD	$N$
Low	Low	2.96	1.15	50
Low	High	3.73	1.33	42
High	Low	3.49	1.09	41
High	High	3.54	1.24	51

Furthermore, the analysis of variance was controlled for respondents' level of involvement, as theoretical assumptions indicated that this could influence the effect of other variables. The results are provided in Table VII. As indicated in the table, inclusion of the two involvement measures only produced minor changes to the previously reported findings, and neither of the involvement measures had significant main effects on the perceived effectiveness of textual information about nudging.

Figure 1 portrays the effects of the full factorial model. The figure shows that the perceived effectiveness of textual information about nudging is lowest for respondents exposed to information with low source credibility and low argument strength. Furthermore, nudging is perceived to be most effective in the high argument strength condition, both for respondents exposed to low and high source credibility. The difference between the two high argument strength conditions is not significant ( $t(91) = 0.699, p = 0.486$ ). The line that indicates the differences between the experimental conditions in Figure 1 is steeper for the low source credibility condition as compared to the high source credibility condition. The low argument strength information is perceived to be significantly more effective when presented in the high source credibility condition, as compared to the low source credibility condition ( $t(89) = -2.255, p = 0.027$ ), while there is no significant difference between low and high argument strength when source credibility is high ( $t(90) = -0.208, p = 0.835$ ). In conclusion, the overall results indicate that source credibility only influences the perceived effectiveness of textual information about nudging when argument strength is low. Therefore, if you can offer strong arguments about effectiveness, the source presenting the information has little influence on the perceived effectiveness of nudging, but when argument strength is low, the information needs to be presented by a credible source in order to be perceived as effective. The implications of these findings are discussed in the next section.

## Discussion

### *Theoretical and practical implications*

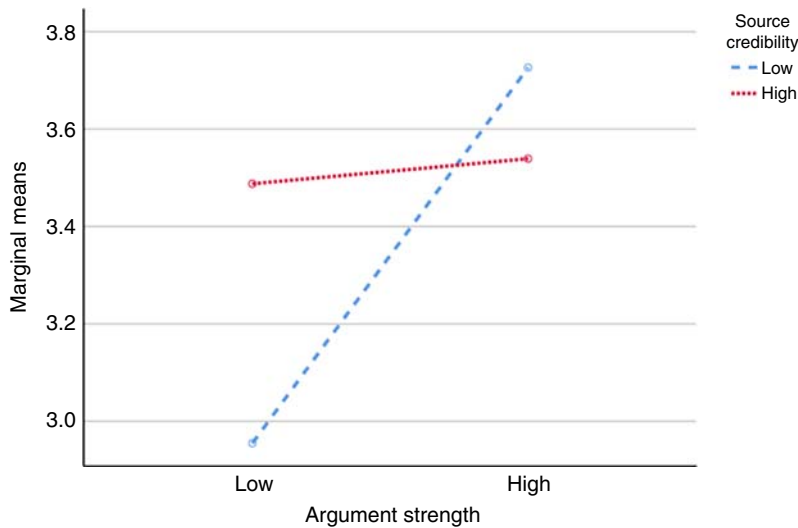
This paper explored how source credibility and argument strength influenced the perceived effectiveness of textual information about food-related nudging. The lack of a significant main effect of source credibility was somewhat surprising. Main effects of source credibility

**Table VI.** Univariate analysis of variance across the four experimental conditions

	<i>F</i>	df	<i>p</i>
<i>Main effects</i>			
Source credibility	0.936	1.180	0.335
Argument strength	5.295	1.180	0.023
<i>Interaction effects</i>			
Source credibility × argument strength	4.054	1.180	0.046

**Table VII.** Univariate analysis of variance controlled for level of involvement

	<i>F</i>	df	<i>p</i>
<i>Main effects</i>			
Source credibility	1.172	1.176	0.281
Argument strength	4.336	1.176	0.039
Self-assessed knowledge	0.488	1.176	0.486
Importance of food	0.079	1.176	0.778
<i>Interaction effects</i>			
Source credibility × argument strength	3.877	1.176	0.051



**Note:** Y-axis increases by 0.2 units

**Figure 1.** Graphical outline illustrating differences in the perceived effectiveness of textual information about nudging across experimental conditions

on persuasive messages have been found in previous studies both within health communication and other contexts, and in most of these studies, source credibility is found to directly influence the perception of the message (Pornpitakpan, 2004; Schmidt *et al.*, 2016). For the development of theoretical knowledge on how to influence the public acceptance of nudging, this non-significant effect implies that the role of source credibility is somewhat weakened. While we may ask whether the manipulation of source credibility in this study is the culprit leading to a rejection of the hypothesis, the manipulation check tells a different story. Following our previous arguments, that the credibility of a source is determined by the message receiver and not the sender, the empirical manipulation check returned significantly different mean credibility scores, located on the opposite sides of the scale (Table I). However, according to previous research, familiarity with the source or medium may influence how information is perceived (Schwarz, 2012). Although both of the sources used in the current experiment are generally well known to the public, the web-page of the newspaper has significantly more readers than the web-page of FHL. While it is tempting to further speculate on causes to the non-significant finding of source credibility, we rather suggest that the effect of source credibility on the perceived effectiveness of information about nudging should be further assessed. Controlling for respondents familiarity with the medium is one possible pathway for future studies.

The results of the current study suggest that argument strength plays an important role when communicating textual information about the effectiveness of nudging. As previously mentioned, perceived effectiveness has been found closely related to acceptance (Diepeveen *et al.*, 2013; Petrescu *et al.*, 2016; Marteau, 2017; Bang *et al.*, 2018; Hall *et al.*, 2018; Cadario and Chandon, 2019), and the study contributes to current knowledge on how acceptance of nudging can be influenced by means of increased perceived effectiveness. From a goal hierarchical perspective, the findings suggest that a higher-level goal of public acceptance of nudging can be pursued by strategies aimed at reaching a lower level goal of increased perceived effectiveness, for which argument strength is one possible option. In this respect, the limited knowledge on how the perceived effectiveness of nudging may be influenced has been somewhat extended by this study.

The results also lend additional support to the pivotal role of argument strength in theoretical models on persuasion and communication. As previously mentioned, Chaiken and Ledgerwood (2012) suggest that quantitative information contributes to arguments being perceived as stronger, and that more detailed information gives stronger arguments than messages with fewer details. This finding is supported both through the manipulation check establishing a significant difference in perceived strength between the two argument conditions, and by the significant main effect of argument strength on the perceived effectiveness of nudging. Hence, our previous suggestion that the important comparison standard for argument strength is not found in the eyes of the researcher or sender, but in the evaluation made by consumers or receivers (Rucker and Petty, 2006), justifies the fact that although our argument strength manipulations may seem marginal on paper, they are found significantly different by the respondents.

From a more practical perspective, but still in line with previous research (Petty and Briñol, 2012), the high argument strength condition included more detailed information about the expected effects of nudging, as well as references to high-quality research findings. Still, the manipulations can be said to be of the marginal kind, and finding a significant effect of this marginal manipulation indicates potential for policy makers to influence a consumer's perceived effectiveness of textual information about nudging by carefully considering the quality of arguments. If strong arguments about expected effects of nudges can be provided, selection of which platform to communicate information on should be based on factors like price, target group availability and impact range, rather than source credibility. On the other hand, there might be situations where validated quantitative information about the effectiveness of a given nudge is not available, or that the communication medium does not allow for detailed arguments. In these situations, findings of the current study suggest that messages with lower argument quality can still be perceived as effective, if they are delivered by a high credibility source, as the source in itself might enhance the perceived quality of the arguments (Chaiken and Ledgerwood, 2012; Kruglanski, 2012). Following this line of reasoning, it is possible that arguments can be seen of high quality without having the attributes of truthfulness or underpinning evidence if they are presented by a trustworthy source. Further investigation of this possible association could be an interesting pathway in future studies.

#### *Limitations and future directions*

In the current study there are several limitations that needs to be considered. The sample is relatively small and homogenous with young adults in higher education being overrepresented. Although the results provide valuable insights about how the effectiveness of nudging should be communicated to facilitate acceptance among young adults, results are not necessarily representative to the general population and should therefore be interpreted with care. Also, using a student sample to investigate the perceived effectiveness of textual information about nudging may be considered a weakness, as students are optimised for learning in textual format. It is therefore necessary to validate the results in larger and more heterogeneous samples before extrapolating the findings to other contexts. Although being somewhat debated (Riener and Willingham, 2010; Kirschner, 2017), theories on consumer learning suggest that people differ in their preferred learning style. Most messaging assumes textual modes over others, and this may not be representative in the general population. The current study only investigated the perceived effectiveness of textual information about nudging. As previously mentioned, information may be perceived differently depending on the mode of delivery (e.g. visual, aural and tactile), and caution should be taken when extrapolating towards other designs of nudge-related information. Also, although public information is still mainly delivered in textual format, young adults are high users of both digital and social media and information



processing in this consumer segment is therefore not necessarily similar to other demographic groups (Romanelli *et al.*, 2009). Investigating how source credibility and argument strength influence the perceived effectiveness of nudging in other message formats, e.g. by using video or podcasts, could therefore be the focus of future studies.

Individuals with high education often tend to have healthier habits and interest in food and healthy eating as compared to other demographic groups (Eikemo *et al.*, 2008; Thornton *et al.*, 2011), and the lack of a significant effect of involvement in the current study may be explained by the samples' high educational level. It is also possible that the inclusion of alternative measures of involvement (e.g. the food-related lifestyle questionnaire or the health consciousness scale) could have produced different results. Based on the previously described association between perceived effectiveness and acceptance of nudging (Diepeveen *et al.*, 2013; Petrescu *et al.*, 2016; Marteau, 2017; Hall *et al.*, 2018), findings of the current study indicate that young adults accept the use of the three nudges that were presented in the news-article (because they find them to be effective). However, studies have identified a number of additional factors that may influence the acceptance of nudging, including the level of intrusiveness and type of nudge (Reisch *et al.*, 2017; Hall *et al.*, 2018; Loibl *et al.*, 2018; Djupegot and Hansen, 2019). As the three nudges investigated in the current study were presented within the same news-article, it is not possible to identify any differences in perceived effectiveness between the nudges, and this may be considered a weakness. Testing the association between source credibility, argument strength, perceived effectiveness and acceptance of nudging within the same study would also contribute to further validate the suggestion that increased perceived effectiveness of nudging is associated with acceptance.

Finally, personal tailoring of information has the potential to further increase the effect of persuasive communication as personal relevance might increase consumers' motivation to process information (Myers, 2010; Petty and Briñol, 2012). The applicable strategy for communication is however largely dependent on the target group, and for information aimed at larger populations, personal tailoring might not be feasible. On the other hand, for messages aimed at smaller groups, tailoring information has the potential to influence how the content is perceived, and this would probably also be the case of the perceived effectiveness of nudging.

## Conclusions

The perceived effectiveness of nudging is established as a reliable predictor of the acceptance of nudging. The current study aimed to investigate how source credibility and argument strength influence the perceived effectiveness of textual information about food-related nudging in order to provide a better understanding of how acceptance of nudging may be facilitated. Findings suggest that argument strength is of major importance when informing young adults about the effectiveness of nudging and furthermore, if evidence on the effect is scarce, perceived effectiveness might be increased if the arguments are presented by a credible source. However, the results on source credibility are somewhat ambiguous, and should therefore be interpreted with care. In conclusion, strong arguments about the effectiveness of nudging may contribute to increase perceived effectiveness and can thereby be used to facilitate acceptance of nudging among young adults.

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## **Paper 3**



**Win some, loose some:**

**The effect of valence framing, target group selection and  
dominant regulatory focus on the perceived effectiveness of nudging**

Djupegot, I.L.<sup>1\*</sup> PhD candidate.

Hansen, H.<sup>1</sup> Professor.

<sup>1</sup> University of Stavanger, Norwegian School of Hotel Management, 4036 Stavanger, Norway.

\*Corresponding author:

Ingrid Laukeland Djupegot, Norwegian School of Hotel Management, University of  
Stavanger, Postbox 8600 Forus, 4036 Stavanger, Norway. Phone: +47 51 83 34 04,  
e-mail: [ingrid.djupegot@uis.no](mailto:ingrid.djupegot@uis.no)

**Abstract**

Governmentally initiated nudges are criticized for undermining consumers' autonomy and freedom to choose. Yet, studies indicate that as long as consumers perceive a nudge to be effective, they generally also support it. Knowledge about how to best communicate evidence of a policy's effectiveness has however been limited. The current study aims to address this knowledge gap by investigating how perceived effectiveness of nudging is influenced by the valence frame and the target group of a nudge-related message. A 2x2 scenario based between-subjects factorial experiment with valence frame (gain vs. loss) and target group (me vs. the public) as factors was applied. Data on respondent's regulatory focus was also collected. Loss-related messages resulted in significantly higher perceived effectiveness of nudging, whereas no significant effects were found for target group. Finally, there was a significant main effect of regulatory focus on the perceived effectiveness of nudging, and perceived effectiveness increased with degree of promotion orientation. The current study sheds light on the antecedents behind one of the strongest and most reliable predictors of consumer's support of nudging and contributes to increase the knowledge of how perception of a policy's effectiveness is influenced by the message design.



### **Introduction**

Nudging is defined as “any aspect of the choice architecture that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives” (Thaler and Sunstein, 2008, p. 6), and Richard Thaler and Cass Sunstein are credited for coining “nudge” as a concept in their book with the same name from 2008 (Thaler and Sunstein, 2008). Although nudge is a relatively new concept, it builds on established theory with inputs from both social- and cognitive psychology, as well as behavioral economy and libertarian paternalism (Marteau et al., 2011, Marchiori et al., 2017). The publication of “Nudge” (2008) yielded a line of research debating the classification and definition of the concept (Ly et al., 2013, Hollands et al., 2017, Mongin and Cozic, 2018), and Sunstein (2018) later addressed this debate and provided some additional clarifications. In the current paper, we follow the original definition as proposed by Thaler and Sunstein in 2008, as well as the updated clarification published by Sunstein in 2018, and define nudges as initiatives aimed to guide people’s behavior in a predictable way, without removing or forbidding the alternatives (Thaler and Sunstein, 2008, Sunstein, 2018). Despite its popularity, nudging has also been subject to ethical criticism, and particularly governmentally initiated nudges are criticized for undermining consumers’ autonomy and freedom to choose (Blumenthal-Barby and Burroughs, 2012, Schmidt, 2017, Sugden, 2017, Levy, 2019). This critique has yielded a line of research investigating consumers’ support of nudging, and the research on this topic is continuously evolving. Studies of consumers’ support of nudging has identified a huge net of antecedents that are associated with support, and recent summaries of the literature on support of nudging and other types of behavioural public policy are provided in Djupegot (2019), Reynolds et al. (2019) and Haggmann et al. (2018). In short, research on acceptance of nudging have expanded rapidly over the past ten years, and the authors propose that the research within this field can be broadly categorized in three groups, where each

group have distinct, but not always mutually exclusive characteristics. The move from stage to stage have however not been cumulative, and it is important to note that the development of a new stream of research has not replaced the previous, but rather complemented and supplemented it. The first group of research on acceptance of nudging contains papers of a descriptive and explorative nature, where different types of nudges are tested for acceptability by asking respondents if they support the use of selected nudges by dichotomous yes/no-responses. This line of research explores acceptability across nations and some studies also compares acceptability of system 1 vs. system 2 nudges (Hagman et al., 2015, Jung and Mellers, 2016, Reisch and Sunstein, 2016, Reisch et al., 2017, Loibl et al., 2018). Support rates are in some studies also controlled for sociodemographic factors (Loibl et al., 2018; Reisch et al., 2017). Studies within this group can be perceived as a direct response to the critical voices that perceive nudges to undermine consumer autonomy and freedom to choose. This group is supplemented by another stream of research, which focus on the underlying factors that might explain support rates across different types of nudging. This research has identified a number of factors associated with acceptability, and perceived effectiveness is established as the strongest and most reliable predictor of acceptance across different types of nudging (Petrescu et al., 2016, Bang et al., 2018, Hall et al., 2018, Djupegot and Hansen, 2019, Reynolds et al., 2019). A recent meta-analysis of the impact of communicating the effectiveness and ineffectiveness of government policies on public support lends additional support to the strong association between perceived effectiveness and support of policies and concludes that support of policies is sensitive to perceptions of effectiveness and ineffectiveness (Reynolds et al., 2020). However, although perceived effectiveness is established as a reliable predictor for acceptance of public policies, knowledge about the most effective way to communicate evidence of effectiveness has been limited (Djupegot, 2019, Reynolds et al., 2019). Drawing on this there is a need for studies that focus on the

antecedents of perceived effectiveness of nudging, including how different message designs influence how information about nudging is perceived. Some studies have started to explore the impact of perceived effectiveness, and this includes one experiment that investigate how disclosure of the nudge design influence its perceived effectiveness (Bang et al., 2018), and one experiment that investigate how source credibility and argument strength influence perceived effectiveness of food-related nudging (Djupegot, 2019). In light of the heated debate about the acceptability of nudging amongst professionals, consumer opinions about nudging are important to consider, and Bang et al (2018) indicates that the consequences of perceived effectiveness are poorly understood. Exploring how different message designs influence perceived effectiveness of nudging would address this knowledge gap and provide a more in depth understanding of how perceived effectiveness may be used as a catalyst to facilitate acceptance. As previous research indicates that perceived effectiveness of nudging significantly influences its acceptability, the focus of the current study is to increase our understanding about how effectiveness of food-related nudging can be most successfully communicated. More specifically, in this study we hypothesize that the perceived effectiveness of nudging will be influenced by whether nudge related information offered to the public is 1) framed in terms of gains versus losses, and 2) whether the information focus on the individual or the society at large. Finally, we also suggest that consumers' regulatory focus plays an important role in portraying these mechanisms. The succeeding paragraphs will outline the theoretical background for our hypothesis, followed by a description of methods and procedures employed to empirically test our predictions. Finally, results are discussed, and theoretical and practical implications offered.

**Valence framing and perceived effectiveness**

A consumer's perception of how effective a nudge is in relation to the behavioral change it is meant to accomplish rests on a cognitive evaluation of the nudge itself, the goal, and the match between these two. This implies that the way the goal is framed becomes an important part of the information that enters this evaluation. Stated in practical terms, an informational message can for example be framed towards the pros of a healthy diet, or the cons associated with an unhealthy one. This largely resembles the framing question studied by Tversky and Kahneman (1981) in their famous Asian disease experiment, where focusing either on the people who will be saved or the people who will die, completely changed the participants preference for alternative health programs. Tversky and Kahneman found that people react differently when exposed to gains (people saved) than when confronted with losses (those who dies). As such, framing an informational message about nudging towards the possible positive outcomes that can be achieved (gains) or negative outcomes that can be avoided (losses), might prove to result in different evaluative outcomes.

Related to this, previous research has found that negative information influences both preferences and attitude formation more than do positive information (Bizer and Petty, 2005). This effect, often termed the negativity bias or negativity effect, is what causes negative events to have power over good ones, bad impressions and bad stereotypes to form quicker than good ones, and bad and negative information to be processed more thoroughly than good and positive (Baumeister et al., 2001). This should intuitively imply that when a goal can be portrayed either as gains or as losses, the message should receive more deliberate consideration if framed towards the negative losses rather than the positive gains. Drawing on Bizer and Petty's work on valence framing (2005), a public policy maker can argue the use of nudging by either focusing on outcomes that the public find themselves in favor of, or on

outcomes consumers are in more opposition to. If something we are opposed to becomes a reality, it may be viewed as a negative and a loss, also in an emotional or psychological way, and losses we are opposed to usually looms larger than the favorability of a similar gain.

When transferred to the context of consumers' perceived effectiveness of nudging, we propose that when nudging is portrayed as a path towards loss reduction, nudging will be perceived more effective than when said to achieve gains. Three arguments deserve special attention in this respect. The first is related to information processing, and how negative information is processed more thoroughly than positive information (Baumeister et al. 2001). Given the previous arguments on people being more concerned about losses than gains, we should be more intrinsically motivated to process information with a negative valence than its positive counterpart. This should result in more attention towards the information offered, and more extensive cognitive interpretations. Second, and related to the process of impression formation, the positive-negative asymmetry indicates that negative information "carries more weight and has a larger impact on impressions than good information" (Baumeister et al, 2001:344). In an early study, Fiske (1980) found that information with a negative valence influenced likeability more than positive information. We suggest that likeability is the output of an information processing and impression formation process that largely resembles the one under scrutiny in this study. When exposed to a message describing nudges, consumer evaluations of how effective this initiative is in terms of contributing to a goal results from a process where negatively framed information (a possible loss) will receive more attention and have a stronger weight on the effectiveness evaluation than the same information with a positive valence (a possible gain). Finally, and related to the concept of loss aversion discussed in the aforementioned study by Tversky and Kahneman (1981), information framed as losses are more likely to activate consumers inherent loss-aversion, which might magnify

both the level of information processing and the positive-negative asymmetry. Conclusively, we suggest that

H1: When information about nudging is described by the health losses that its implementation may reduce, it will be perceived as more effective than if the same information is framed in terms of the health gains that will be achieved.

**The optimal impact phenomenon and perceived effectiveness**

In a recent study of perceived effectiveness on the acceptability of choice architecture, Bang et al. (2018) found that participants generally thought others to be more influenced by nudging than they would be themselves. For example, the authors used a plate size visual nudge followed by a description on how smaller plates make people eat less and found that participants deemed others more susceptible to be influenced by this than they thought they would be themselves. These results are in line with a large body of research on the Third-Person Perception (TPP), which holds that “a person exposed to persuasive communication in the mass media sees this as having a greater effect on others than on himself or herself” (Davison, 1983:1). Biased optimism is a usual explanation for this effect and holds that we believe others to be more affected by negative events than ourselves (Gunther and Mundy, 1993; Weinstein, 1980). Gunter (1991) further suggested that TPP is caused by a tendency to attribute the behaviors of others to the actor, while our own behavior is attributed to the situation. Within the domain of communication, research has shown that messages found negative to be influenced by will evoke a TPP (Paul, Salwen and Dupagne, 2000; Sun, Pan and Shen, 2008; Xu and Gonzenbach, 2008; Feng and Guo, 2012; Eisend, 2017). Previously in this paper we argued that the perceived effectiveness of a nudge is based on an evaluation of both the nudge and the goal it is set to achieve. Drawing on Bay and Daniel’s

(2003) discussion of the hierarchy of goals, we suggest that eating less is a *program* level goal, which implies that it is reached by specific actions, or following a given program. Obtaining a better health condition is a higher level goal, and can arguably be labeled a *principles* goal. This implies that the goal itself does not “produce direct action, but forms the basis for determining what that action will be” (Bay and Daniel, 2003; 672). According to Hansen et al. (2011:376), a “higher level (principles) goal of a better health affects the lower level (program) goals, and to reach the higher-level goal the individual has to obtain the goals defined at the lower level”. Following from this, eating less is just a means to an end, and an intermediate, program level goal. For the individual exposed to the nudge, but also for the public policy makers that introduces it, obtaining a better health is the higher level, principles goal that follows from eating less. Drawing on this line of reasoning, we aim to extend Bang et al.’s (2018) study in two ways. First by focusing on goals or outcomes of nudging that is on a higher level, and second by scrutinizing whether addressing the effect of “me versus others” directly in the informational message rather than in a post-exposure measure influence the perceived effectiveness of nudging. Why focusing on higher level goals is worth a closer examination, we suggest, can be explained by First- and Third Person Perceptions and the optimal impact phenomenon.

As mentioned, previous research has shown that a TPP will typically be evoked by messages found negative to be influenced by. However, messages found positive to be influenced by will often result in the opposite, called a First-Person Perception (FPP) (Gunther and Thorson, 1992; Gunther, 1995). In their study on sustainability messages, Hoorens and Ruiter (1996) found a TPP when attitudinal media impact was considered undesirable, while a reversed effect (FPP) occurred when attitudinal media influence was considered desirable. In other words, we think others are more influenced by negative things than we are ourselves, while

we are ourselves more likely to be influenced by positive things than are others. The authors suggested that the concept “optimal impact phenomenon” is a better description than FPP/TPP to describe how people believe their own response to messages is optimal compared to the response among others. Related to the context of Bang et al’s (2018) study and the one reported here, being influenced by nudges that makes you reach higher order goals might be viewed as more positive than to be influenced by nudges that address lower level goals. A message explaining that nudging causes a socially desirable outcome that is considered smart to be influenced by, could therefore, based on a self-enhancement explanation, result in a FPP (Hoorens and Ruiter, 1996). If so, the focus on simply eating less would render a TPP in line with Bang et al (2018), while a focus on the more positive, higher order, health condition improvements might result in a FPP, in line with for example Skeiseid et al’s (2020) study on sustainable tourism behavior. Or stated differently; when evaluating nudges and their beneficial higher order outcomes, people might find that “these are good things that will impact my behavior, but I do not think others see it the same way”.

In previous studies on the TPP/FPP-distinction, or the optimal impact phenomenon, what have typically been tested is how much participants think a message will influence them vs. how much they think it will influence others (eg. Bang et al., 2018; Skeiseid et al., 2020). This is a post-exposure measure of a message that can tell two stories (at least): one with the reader in focus (eg. smaller plates will make *you* eat less), or with a larger public in mind (eg. smaller plates will make *people* eat less). Hence, an effectiveness evaluation can differ depending on whether the message *itself* focuses on how the nudge(s) in question will influence the reader (me) or the general public (others). In Bang et al. (2018), the messages conveyed to participants focused 1) on lower order goals, and 2) on *people* (others) as the central unit. In the study reported here, we test how a message that presents nudging as a



means to reach 1) higher order goals for 2a) the general public (others), or 2b) the reader (you). In practical terms, we are taking the TPP/FPP or “me versus others” distinction into consideration when designing the message itself, and as an extension of previous research we test whether such a difference in who nudging is argued to benefit will influence the perceived effectiveness. Based on the theoretical and practical assumptions outlined above, we suggest that:

H2: a nudge described as being beneficial to the reader’s higher order health goals will be found more effective than one that assigns the same benefits to the general public.

#### **Regulatory focus and perceived effectiveness**

The third hypothesis tested in this study rests on an assumption that how consumers judge the effectiveness of a nudge can also be enlightened by knowledge on positive or negative needs (Murray, 1938; Schiffman, Kanuk and Hansen, 2012), approach-avoidance motivation (Lewin, 1935; Carver, Sutton and Scheier, 2000), or the prevention-promotion goals from regulatory focus theory (Higgins, 1997). These all share the basic premise that people approach pleasure and avoid pain (Elliot, 2008). In this study we focus on people’s prevention or promotion focus, and the idea that promotion and prevention goals can not only be situationally activated, but that individuals also differ on being inherently more prevention or promotion oriented (Higgins, 1997 and 1998). In other words, people can be chronically more concerned with the goals and behaviors that motivates them the most, and for some these are promotion oriented, for others prevention oriented (Lockwood et al., 2002). According to Aaker and Lee (2001), the orientation towards higher order goals like approach and avoidance

are important to the understanding of consumer behavior because they “provide insight into how certain lower order consumption goals are made and fulfilled” (pp. 33).

Our first hypothesis suggests that the perceived effectiveness of a nudge will differ depending on the valence frame of the message that describes it (gains vs. losses). That is, we suggest that the message can influence perceived effectiveness evaluations. In this third hypothesis, the focus is moved from the message to the receiver, and we suggest that the receiver’s chronic regulatory focus will affect how effective the described nudges are perceived to be. Lockwood et al. (2002) suggest that chronically accessible promotion or prevention goals can influence motivation in the same manner as do temporarily induced goals. Following this line of reasoning, and the empirical support obtained by Lockwood and her colleagues, we suggest that being chronically promotion or prevention oriented will influence people’s evaluation of how effective a means (nudge) is to reach an end (output described in the message). Related to our context, this should imply that message receivers that are chronically promotion oriented might find the nudge more or less effective than do the chronically prevention oriented ones. Lockwood et al. (2002) approach chronic regulatory focus in line with the original work by Higgins and his colleagues (see Lockwood et al. 2002 for details), and focus on the accessibility of “ideal and ought self-guides” (pp. 859) as these are argued to reflect the strength of prevention and promotion concerns. In this study, we portray higher order outcomes that are positive for the individual regardless of the valence framing of the message itself, and as this should appeal to the higher order ideal self we suggest that the perceived effectiveness of nudging will increase with more promotion dominated chronic regulatory focus. Our third hypothesis thus reads:

H3: the more dominant the promotion oriented chronic regulatory focus, the higher perceived effectiveness of nudging.

### **Methods and procedures**

A 2x2 scenario based between-subjects factorial experiment with valence frame (gain vs. loss) and target group (me vs. the public) as factors was applied to address the hypotheses of the current study. To test the proposed hypotheses, we designed four different versions of a text about health, diet and non-communicable diseases, where valence frame and target group varied between the experimental conditions. The main structure of the text built on material retrieved from the web-page of “Health Norway”(helsenorge.no), which is a public website that communicates health related content produced by various actors in the health sector, and the material is verified by public health actors and selected hospitals (Helsedirektoratet, 2016). In addition to the material on the association between diet and non-communicable diseases, we included a fictitious story about a recent research project from Sweden, which aimed to make more people follow dietary recommendations. We told the respondents that a number of municipalities had participated in a pilot-project where healthy foods were given more visible locations and labels in food stores and supermarkets, the size of “pick-your-own” candy bags were reduced, and small portion sizes were served as the default option in restaurants and cafeterias, unless the customer actively asked for a bigger portion. Furthermore, respondents were told that the pilot project included a monthly SMS-service, which reminded the citizens to consume “5-a-day” and to be active for a minimum of 30 minutes per day, in line with the official recommendations. Finally, the article stated that research suggest that people have a tendency to follow the eye instead of the stomach when filling the plate in self-service buffets, and the plate size in public cafeterias and food outlets were therefore reduced by 2 cm to make it easier to choose a smaller portion. The measures

were presented in the exact same wording across all four experimental conditions, but the valence frame of the association between diet and non-communicable diseases and the target group of the measures varied between experimental conditions. The original text on the webpage of Health Norway is positively framed and states that a healthy diet combined with physical activity reduces the risk of cardiovascular diseases, type 2-diabetes, high blood pressure, several types of cancer, osteoporosis, caries, overweight and obesity. The original text induces a feeling of positive health outcomes and was therefore used in the gain-condition. For the loss-condition, we wanted to induce a feeling of increased risk of negative health outcomes, and we therefore changed the valence frame to focus on the increased risk for non-communicable diseases from having unhealthy dietary- and activity habits. The non-communicable diseases that were mentioned, was however kept constant across conditions.

To test hypothesis 2, we needed to experimentally manipulate how the effectiveness of nudges described in the text related to different target groups (me vs. the public). We therefore aimed the measures outlined above towards the reader (me) in one of the conditions, and towards the public in the other condition. Furthermore, the outcome of having a healthy/unhealthy diet focused on good/bad health outcomes for me in one of the conditions, and for the public in the other condition. The texts were presented in Norwegian language and counted about 375 words with some minor variations between experimental conditions.

#### *Measures*

The variables that were not experimentally manipulated were measured using a combination of self-constructed items and scales adapted from existing literature. The measure of perceived effectiveness of nudging counted four items and built on “the perceived effectiveness of nudging”-scale used in Djupegot (2019). However, as two of the original

items distinguished between perceived effectiveness for “me” vs. “my friends”, these items were replaced with new items since target group was one of the factors that were experimentally manipulated. The scale was constructed by averaging the four items, and reliability analysis showed that the scale was reliable ( $\alpha = 0.88$ ).

The scale measuring regulatory focus counted 18 items and included two subscales designed to measure prevention and promotion goal strength, respectively. The majority of the items were directly retrieved from the “promotion/prevention scale” used in Lockwood et al., (2002), while some items were adapted to fit the context of the current study. When summarizing the items measuring regulatory focus, we applied the same scoring system used by Lockwood et al. (2002). First, we created one index for promotion goal strength, and one for prevention goal strength, by averaging the nine items belonging to each of these subscales. Reliability analysis showed that both of the subscales were reliable (prevention  $\alpha = 0.78$ , promotion  $\alpha = 0.82$ ). Similar to the findings in Lockwood et al. (2002), promotion goal strength ( $M = 4.66$ ,  $SD = 0.87$ ) had higher average scores than prevention goal strength ( $M = 4.19$ ,  $SD = 0.91$ ). To identify the dominant regulatory focus for each participant, we subtracted mean scores on prevention goal strength from mean scores on promotion goal strength. This procedure generated a new variable with values ranging from -2 to 3 ( $M = 0.44$ ,  $SD = 0.79$ ). Respondents with a negative value were mainly prevention oriented, participants with a score of zero had no dominant regulatory focus, and respondents with a positive value were mainly promotion oriented. In the sample of the current study, 25 per cent were prevention oriented, 6 per cent had no dominant regulatory focus, and 69 per cent were promotion oriented.

*Control variables*

Although previous research has identified a strong and reliable association between perceived effectiveness and acceptance of nudging (Petrescu et al., 2016, Bang et al., 2018, Hall et al., 2018, Djupegot and Hansen, 2019, Reynolds et al., 2019, Reynolds et al., 2020), we also chose to include four items measuring acceptance of nudging to ensure criterion validity of the proposed model. The scale measuring consumers' acceptance of nudging counted four items. Development of items were inspired by previous research investigating consumers acceptance of nudging (Hagman et al., 2015, Reisch et al., 2017, Djupegot and Hansen, 2019) although the wording of the items was adapted to fit the context of the current study. The scale was constructed by averaging the four items, and reliability analysis showed that the scale was reliable ( $\alpha = 0.92$ ).

Previous research has found that the perceptions and impressions consumers hold about nudging and public policy can vary between males and females (Diepeveen et al., 2013, Reisch et al., 2017, Djupegot and Hansen, 2019), yet other studies finds no gender differences in approval rates (Petrescu et al., 2016). To account for potential gender differences in perceived effectiveness of nudging, we included gender as a covariate in our current model for explorative purposes.

Face validity and content validity of the survey were assessed in a two-step process. First, a committee including persons both with and without formal research experience were asked to evaluate the texts for wording and readability. This resulted in some minor adjustments. Thereafter, five randomly selected respondents filled out the survey and where asked to give their comments on the design. Time used both for reading the text and completing the full

survey were also measured before the survey was launched. All measures are listed in Table 1, with (r) denoting reversed items.

- Table 1 about here -

### *Sample*

A national representative sample of 300 respondents was digitally recruited by a marketing agency (Norstat). Age ranged from 18 to 91 years ( $M = 48.8$  years,  $SD = 17.0$ ), and 51 per cent of the sample were females. Participants were randomly assigned to the four experimental conditions, leaving each cell with a total of 75 respondents. The experiment was performed digitally, and the procedure opened with an information page, informing respondents that in this survey they would be asked to read a text, before answering some questions related to the text they had read. Pre-tests had showed that it took between 60 and 120 seconds to read the text, and a test of the live version showed that some respondents moved on to the questions without having spent enough time on the text page to actually having read it all. We therefore included a timer that hindered respondents to go to the next page before they had spent enough time on the text. Based on the pre-tests, the timer was set to 60 seconds.

After reading the text, respondents were asked to rate their agreement to the statements measuring perceived effectiveness and acceptance of nudging. Respondents were also informed that it was possible to go back and read the text over again if they felt that this was necessary in order to answer the questions. Finally, respondents were asked to rate their

agreement with the 18 items measuring regulatory focus. All measures that were not experimentally manipulated were designed as 7-point Likert-type statements, anchored “totally disagree” and “totally agree”. After completing the survey and submitting the answers, all respondents were informed that the text they had read were designed for research purposes, and that names, places and numbers in the text, did not give a correct description of reality. This was done to avoid dissemination of misleading and incorrect information.

### **Results**

To test our hypotheses, we ran univariate ANOVA with perceived effectiveness of nudging as the dependent variable, valence frame and target group as fixed factors, and gender and regulatory focus as covariates. The results show a significant main effect of valence frame, with the loss condition leaving a higher level of perceived effectiveness than the gain condition, thus supporting hypothesis 1. As for hypothesis 2, which assumed that a message that focused on benefits for the reader (“me”) would be found more effective than one that focused on how nudging would benefit the general public, there was no significant difference between the experimental groups. Finally, there was a significant main effect of regulatory focus on the perceived effectiveness of nudging, and in line with hypothesis 3, the perceived effectiveness increased with more dominant promotion orientation. As for the gender variable, the results show that women perceive nudging to be significantly more effective than do men. Table 2 portrays the mean scores for perceived effectiveness across the experimental cells, while Table 3 shows the results of the ANOVA in numbers.

- Tables 2 and 3 about here -



As an attempt to validate our results beyond the model specifically elaborated, we regressed the perceived effectiveness index on the acceptance measure, and in line with the arguments presented in the introduction, we found a positive and significant effect ( $\beta = 0.943$ ,  $t = 24.91$ ,  $p < 0.001$ ). That is, higher levels of perceived effectiveness is associated with higher levels of acceptance of nudging. This is a form of criterion validity that serves to strengthen the generalizability of our results, as it is in line with the results found in previous studies (e.g. Petrescu et al., 2016; Djupegot and Hansen, 2019; Bang et al., 2018; Hall et al., 2018)

### **Discussion and policy implications**

Within the domain of behavioral public policy, and the application of nudges as a tool to initiate behavioral change, the public's acceptance of nudging has been at the forefront of both academic and societal debate (Djupegot, 2019). The attempts to understand what enhances or inhibits this acceptance has identified perceived effectiveness as a strong and reliable predictor, showing that if consumers perceive nudges to be an effective means to reach a socially desirable goal, they are more prone to accept it (e.g. Petrescu et al., 2016; Djupegot and Hansen, 2019; Bang et al., 2018; Hall et al., 2018). As an extension of this stream of research, our results hold several implications. Firstly, in support of how valence framing influence consumer evaluations of messages conveyed to them, and how a negativity bias might influence this evaluation, our study suggests that people find most effective the behavioral public policies that help avoid potential losses. Tversky and Kahneman (1981) suggested that people are loss averse, and we have argued that the losses argued to be reduced from nudging would loom larger than the same benefits framed as gains. Our results are in line with this reasoning. For practitioners and public policy makers, this is important, not at least because it seems as though a focus on reaching gains are often more prominent than

avoiding losses. As mentioned in the methods section, the information we based our textual manipulation on was sampled from the information webpage of “Health-Norway” (helsenorge.no), which is originally designed with a gains-approach. We do not think they are the only ones choosing this approach, and a quick search for equal informational messages on other outlets gave several anecdotal examples of positively framed information that could easily have told the same story with a difference valence. We do however not suggest that the effects of nudging should be framed as outright fear-appeals, but that practitioners should carefully consider the valence framing of their messages as the message design might influence how the content is perceived. It is also important to note that although our findings on the effect of valence framing were significant at the 0.05 level, results should be interpreted with caution until findings have been replicated in future studies.

Secondly, we find that the more promotion-oriented peoples’ regulatory focus is, the more effective they find nudging. This implies that people’s inherent aspiration to achieve things influence how effective they find nudging to be, and an increasing level of promotion orientation is likely to be accompanied by a positive evaluation of how effective a means is to an end. A basic definition of personality says that it encompass the inner psychological characteristics that reflect how we react to stimuli in the environment (Schiffman, Kanuk and Hansen, 2012), and our results suggest that the more dominant the promotion orientation the more people will embrace means that can lead to positive ends.

Due to the measurement level of our scale, we used the dominant regulatory focus measure as a covariate, which does not test any interactions with the other variables. There might be reason to believe that the loss framed message would appeal more to the prevention oriented, while the gain frame would be found most effective among those who are primarily

promotion oriented (Sherman et al, 2006). This motivated some extra exploratory analyses of our data. We first split the sample in two based on the dichotomous frame variable, and then regressed perceived effectiveness on dominant regulatory focus in both sub-samples. There were no significant differences in regression coefficients from the two sub-samples. We then dichotomized the dominant regulatory focus variable based on those over and below a score of zero, and included this as a fixed factor in the ANOVA. We did the same again with groups based on the median, and then the mean, of the dominant regulatory focus score. Finally, we removed the ones with a zero score, split the rest in two, and re-ran the ANOVA once more. None of these four tests returned any significant interactions between framing and dominant regulatory focus. Thus, we believe that the dominant regulatory focus, when approached as a personality characteristic, directly influences the perceived effectiveness of nudging when the outcome is described as clearly as here. Whether the effect depends on such a distinct presentation of the outcome is an interesting question we offer for future research.

Thirdly, we find that whether the message explains how a nudge will benefit the general public or the reader herself, does not influence how effective it is perceived to be. We argued that a message addressing the reader would be more effective, based on the assumption that a higher order goal related to health conditions would push participants towards a FPP-effect, and that including the me/others distinction in the message itself should induce a more positive evaluation among those who saw the me-frame compared to the others-frame. The implications for theory are that we cannot, based on this study, suggest that the me/others distinction in message design affects the effectiveness evaluation of a nudge related message. However, for practitioners this also implies that our study does not conclusively find one option (me/others) to be a more effective message design than the other, which grants the practitioner the freedom to choose from a set of equally effective alternatives.

To the best of our knowledge, no previous studies have investigated the association between gender and perceived effectiveness of nudging. The findings of the current study indicates that females perceive nudges to be more effective than men, and the study thus contributes to shed light on a previously unexplored relationship. Considering the established association between perceived effectiveness and acceptance of nudging, the finding of the current study is however not surprising, as previous studies have found females to report higher accept rates of nudging as compared to men (Diepeveen et al., 2013, Reisch et al., 2017, Djupegot and Hansen, 2019).

As pathways for future research, we would like to suggest the following: First, and following from our elaboration on the optimal impact phenomenon, we believe it would be fruitful to study the perceived effectiveness and acceptance of nudges that address goals at different hierarchical levels. To the best of our knowledge, no study has yet tested how a TPP found for lower level goals (e.g. eat less) might shift to a FPP if the same nudge contributes to goal achievement at higher levels (e.g. losing weight or gaining a better health). Second, our study focus on health issues that are directly related to the individual. Further generalizations across other behavioral domains, like waste reduction, reduced carbon gas emissions, etc., where the benefits are on the societal level rather than the individual one, are warranted and would extend the current knowledge on factors important to consider when informing the public of policies planned or implemented. Finally, a replication with participants sampled from cultures less prone to accept governmental interventions would prove useful for the validity of our results. By ever expanding the understanding of how the effectiveness, and acceptance, of nudging can be communicated, public policy makers will have a larger toolbox to choose from in their day-to-day operations.

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Table 1. Measurement scales

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<b>Perceived effectiveness of nudging</b>
1. The measures mentioned in the article are an effective way of influencing dietary choices
2. The measures mentioned in the article facilitate healthy food choice
3. The measures mentioned in the article will not influence food-related choices (r)
4. The measures mentioned in the article are suitable to influence dietary choices
<b>Acceptability of nudging</b>
1. I support the use of the measures mentioned in the article
2. I think it is okay that such measures are used to influence the diet in a healthier direction
3. I think that the government should avoid the use of such measures (r)
4. I think it is okay that such measures are used to facilitate healthier choices
<b>Regulatory focus</b>
<i>Prevent</i>
1. In general, I am focused on preventing negative events in my life
2. I often worry about not having a healthy diet
3. I am more oriented toward preventing losses than I am toward achieving gains
4. It is important for me to avoid getting sick
5. I am anxious that I will fall short of my responsibilities and obligations
6. I often think about how I can prevent bad health outcomes
7. I often imagine myself experiencing bad things that I fear might happen to me
8. It is important for me to avoid unhealthy food items
9. I frequently think about how I can prevent failures in my life
<i>Promote</i>
1. I typically focus on the success I hope to achieve in the future
2. I often think about the person I would ideally like to be in the future
3. I often imagine myself experiencing good things that I hope will happen to me
4. I often think of what I can do to promote my health
5. It is important for me to have a healthy diet
6. I frequently imagine how I will achieve my hopes and aspirations
7. Overall, I am more oriented toward achieving success than preventing failure
8. In general, I am focused on achieving positive outcomes in my life
9. It is important for me to be healthy

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Table 2.  
Mean scores for perceived effectiveness of nudging across all experimental conditions

Valence frame	Target	<i>N</i>	Mean	<i>SD</i>
Loss		150	5.46	1.15
Gain		150	5.14	1.15
	Me	150	5.28	1.22
	The public	150	5.32	1.10
Gain	Me	75	5.05	1.24
Gain	The public	75	5.22	1.05
Loss	Me	75	5.50	1.17
Loss	The public	75	5.42	1.14

Table 3.  
Hypotheses test results  
Univariate Analysis of Variance

		Perceived effectiveness	
		<i>F</i>	<i>p</i>
<i>Main effects</i>			
	Valence frame	4.182	.042
	Target	.502	.479
<i>Interaction effects</i>			
	Valence frame x Target	.121	.728
<i>Covariates</i>			
	Dominant regulatory focus	11.244	.001
	Gender	10.594	.001